IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHAL DIVISION

EFFECTIVE EXPLORATION, LLC, Plaintiff, v. CLASSIC OPERATING CO., LLC, ET AL. Defendants	Case No. 2:14-cv-00869-JRG-RSP ***LEAD CASE***

MEMORANDUM OPINION AND ORDER

Before the Court is the opening claim construction brief of Effective Exploration, LLC ("Plaintiff") (Dkt. No. 44, filed on June 19, 2015),[1] the response of Aruba Petroleum, Inc. and Comstock Oil & Gas, L.P. ("Defendants") (Dkt. No. 46, filed on July 6, 2015), and the reply of Plaintiff (Dkt. No. 51, filed on July 13, 2015). The Court held a hearing on the issues of claim construction and claim definiteness on July 31, 2015. Having considered the arguments and evidence presented by the parties at the hearing and in their briefing, the Court issues this Order.

[1] In this order, citations of the parties' filings in this case are to the filing's number in the docket for the lead case (Dkt. No.) and pin cites are to the page numbers assigned through ECF.

Table of Contents

I. BACKGROUND

Plaintiff alleges infringement of U.S. Patent No. 8,813,840 (the "'840 Patent"). The '840 Patent is entitled "Method and System for Accessing Subterranean Deposits from the Surface and Tools Therefor" and names a single inventor, Joseph Z. Zupanick. The application leading to the '840 Patent was filed on August 12, 2013 and the patent issued on August 26, 2014. The '840 Patent is related through a series of continuation, continuation-in-part, and divisional applications to an application filed on November 20, 1998, which issued as U.S. Patent No. 6,280,000.

The '840 Patent is one of a large family of patents that claim priority to U.S. Patent No. 6,280,000. Two of these related patents contain claim terms that are currently before the Court and that have been construed by the U.S. District Court for the Western District of Pennsylvania: U.S. Patents No. 6,976,533 (the '533 Patent, entitled "Method and System for Accessing Subterranean Deposits from the Surface") and No. 8,469,119 (the "'119 Patent," entitled "Method and System for Accessing Subterranean Deposits From the Surface and Tools Therefor"). The '119 Patent issued from a continuation of Application No. 10/630,345 (the "'345 Application," filed July 29, 2003). The '840 Patent claims priority to the '345 Application as a continuation of Application No. 11/982,249, which is a continuation of the '345 Application.

In general, the '840 Patent is directed to systems and methods for recovering fluids (e.g., water, oil, gas) from subterranean geological formations, and utilizes special configurations of directed bore holes ("bores"). In its 122 columns of text and 115 figures, the '840 Patent describes diverse technology related to the drilling of wells and to the production of formation fluids. The description includes numerous examples of wells and bores (e.g., vertical, horizontal,

slanted, articulated, undulated) and numerous examples of multi-well and multi-bore patterns (e.g., multi-well systems, multi-bore wells, multi-bore drainage patterns).

The abstract of the '840 Patent provides:

> According to one embodiment, a system for accessing a subterranean zone from the surface includes a well bore extending from the surface to the subterranean zone, and a well bore pattern connected to the junction and operable to drain fluid from a region of the subterranean zone to the junction.

An example of a multi-well system is shown in Figures 1 and 3, which are reproduced below and annotated by the Court. The figures depict a vertical bore (12) and an articulated bore (3) each extending down from the surface to intersect at an enlarged cavity (20) in the target zone (15). The articulated bore is horizontal (34) at the point it intersects the vertical bore. A pattern of bores (50)are drilled beyond the junction to facilitate draining fluids from the zone, and ultimately to produce the fluids to the surface. '840 Patent col.12 l.42–col.16 l.8; col.16 l.25–col.18 l.3.

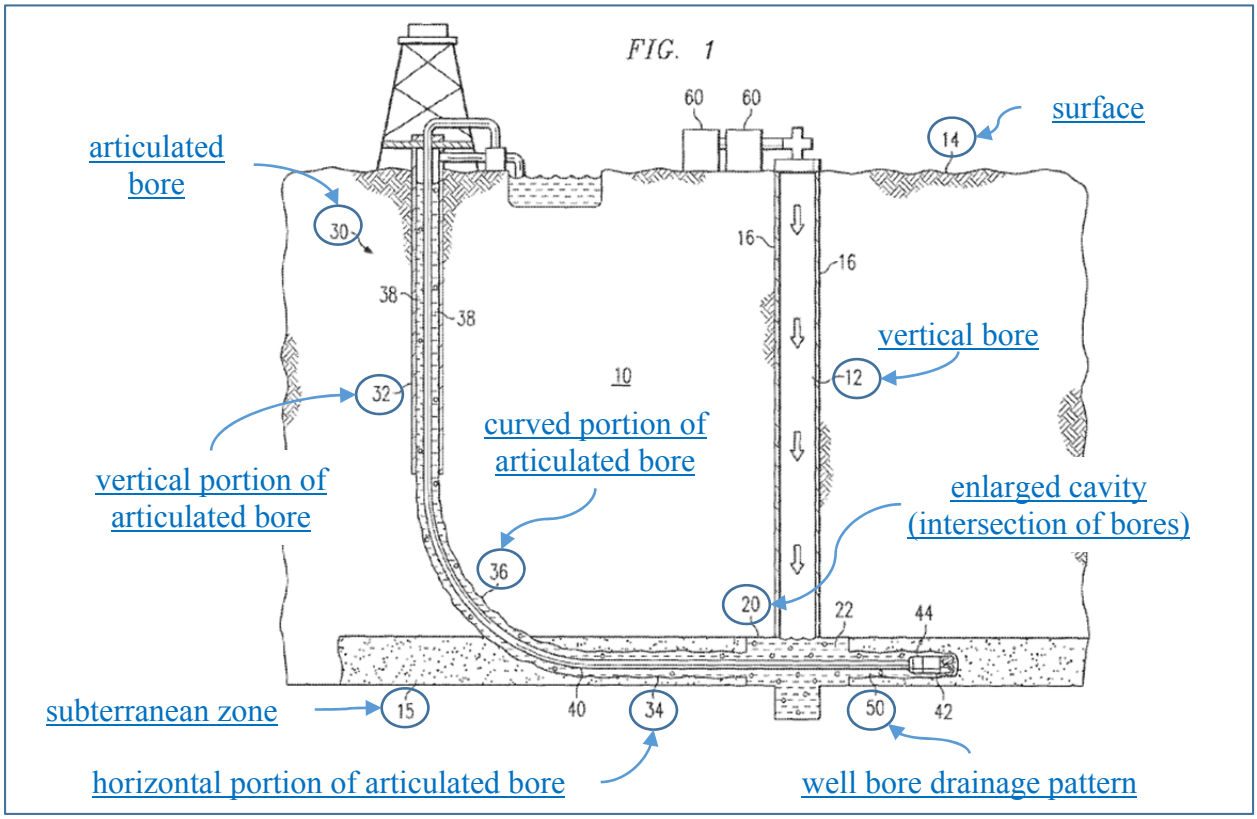
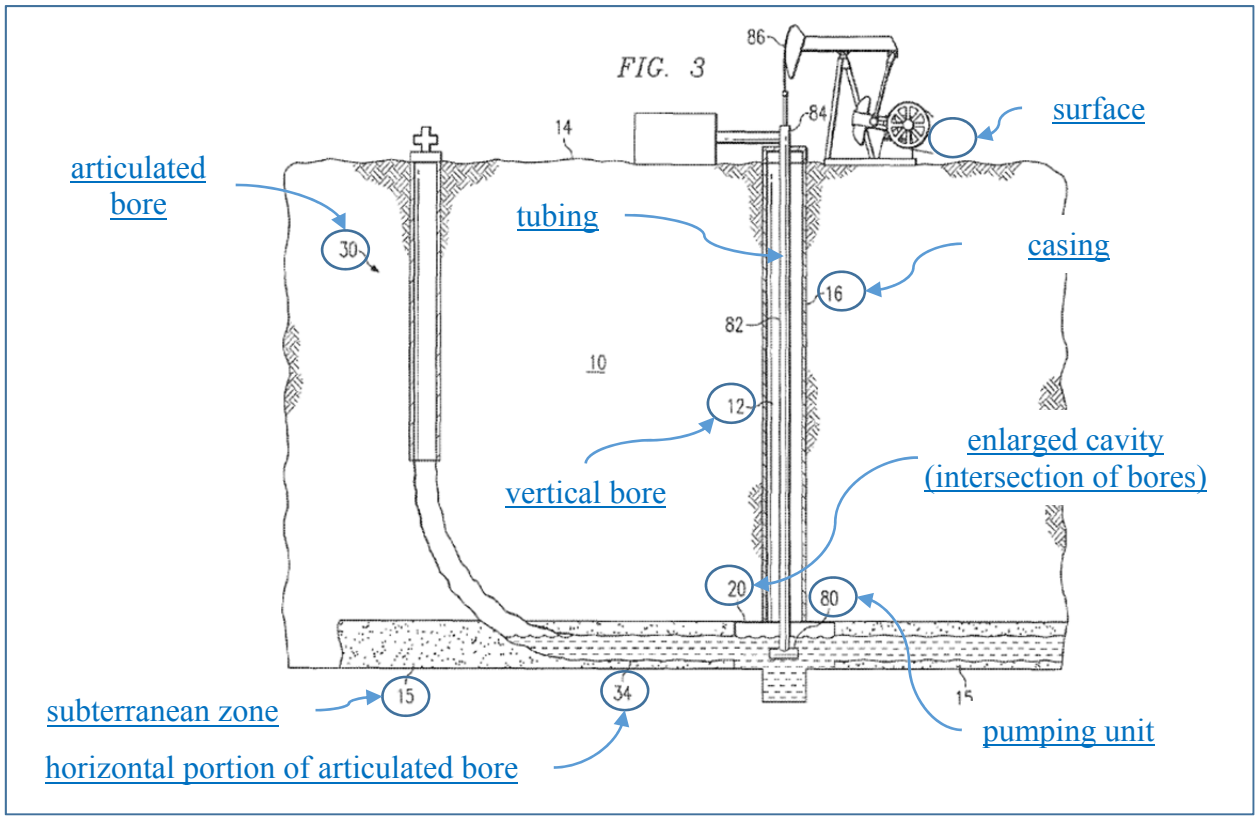
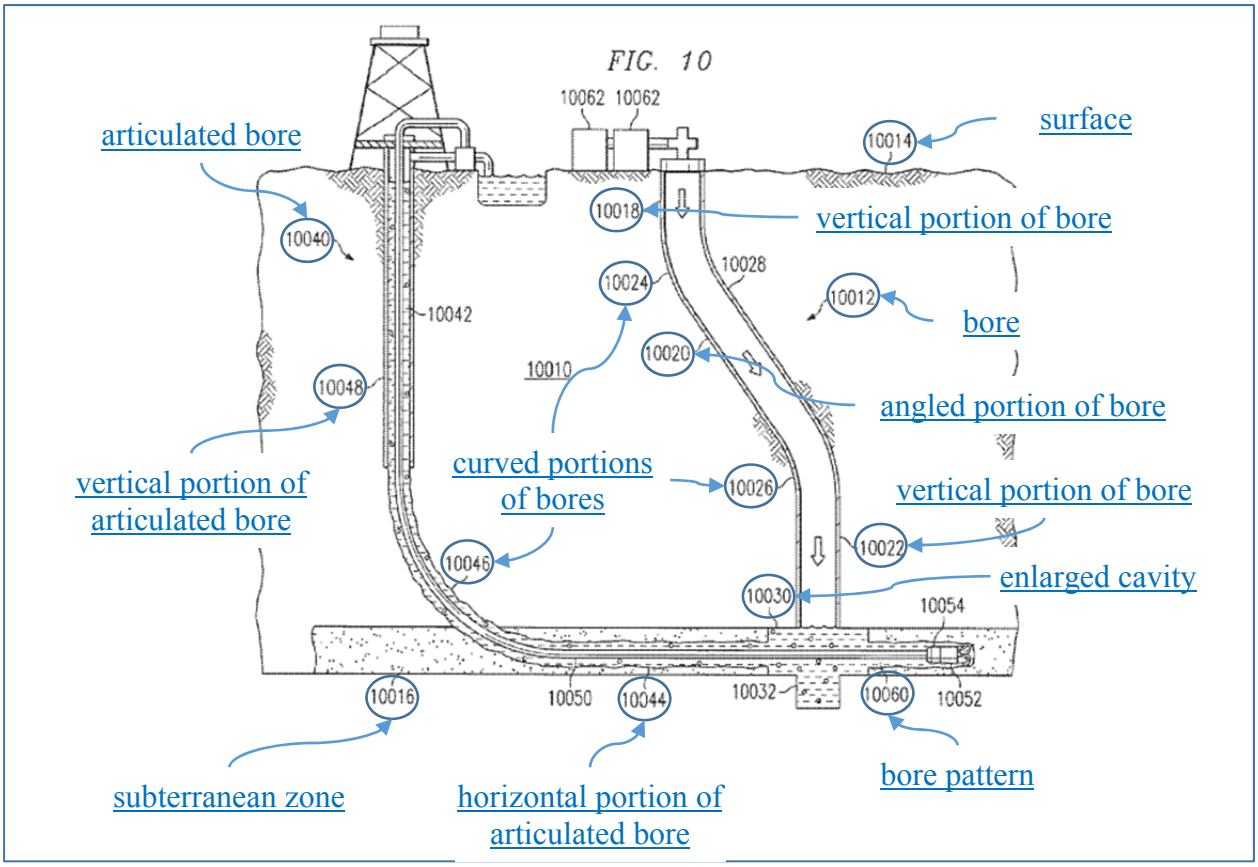


Figure 3 depicts the system of Figure 1 in a production configuration. A pump (80) moves water to the surface through a tubing string disposed in the vertical bore and allows gas to flow to the surface through the annulus between the tubing string and the casing (16) in the vertical bore. '840 Patent col.12 l.42–col.16 l.8; col.16 l.25–col.18 l.3.



Another example of a multi-well system is shown in Figure 10, which is reproduced below and annotated by the Court. The main difference between the example of Figure 1 and the example of Figure 10 is that the vertical bore (12) of Figure 1 is replaced with a bore (10012) that includes vertical (10018, 10022) and angled (10020) portions. The example of Figure 10 includes an enlarged cavity (10030) at the junction of the articulated bore (10040) and the vertical/angled bore (10012). The system further includes a bore pattern (10060) to facilitate draining fluids from the zone (10016). '840 Patent col.27 l.65–col.24 l.48.



An example of a multi-bore well is shown in Figures 6A (drilling) and 7 (production), which are reproduced below and annotated by the Court. The figures depict a bore system that extends to the zone (6015) from a single entry point on the surface (6014). The bore system includes two connected vertical bores (6210, 6220) and two articulated bores (6230, 6235). The second vertical bore (6220) extends from the first vertical bore (6210). The first articulated bore (6230) extends from the first vertical bore, and the second articulated bore (6235) extends from the second vertical bore. The two articulated bores intersect at a cavity (6250) within the zone (6015). A bore pattern (6050) extends from the cavity to facilitate draining fluids from the zone. '840 Patent col.23 l.9–col.25 l.53.

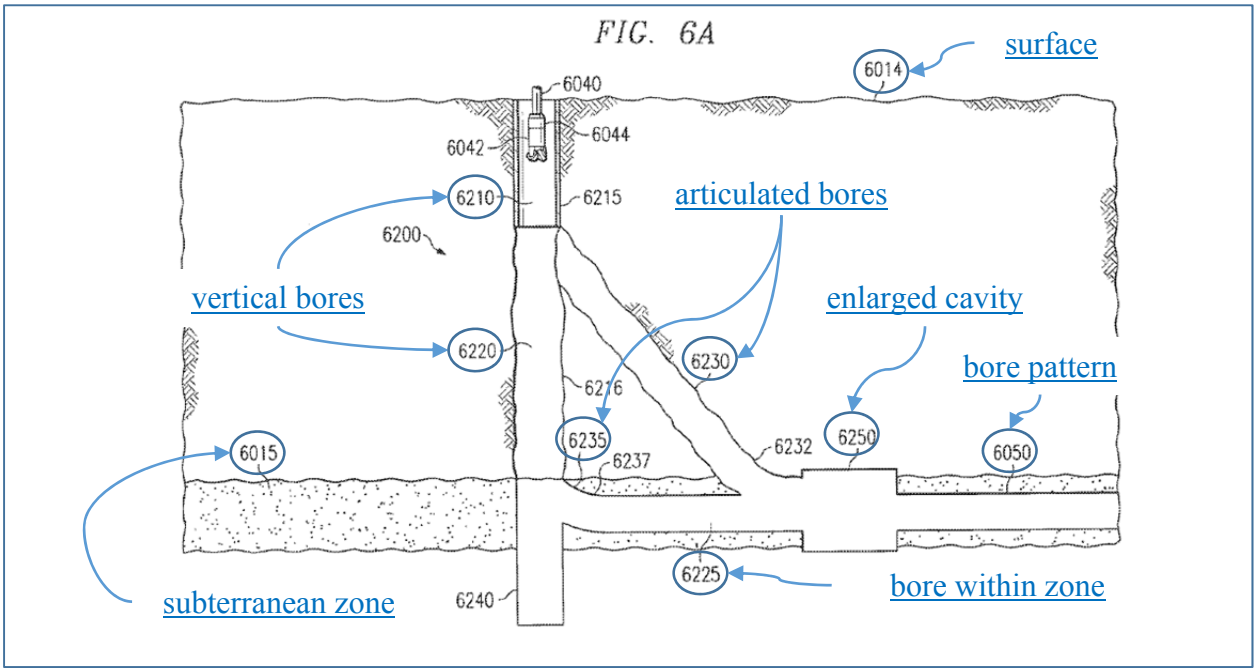
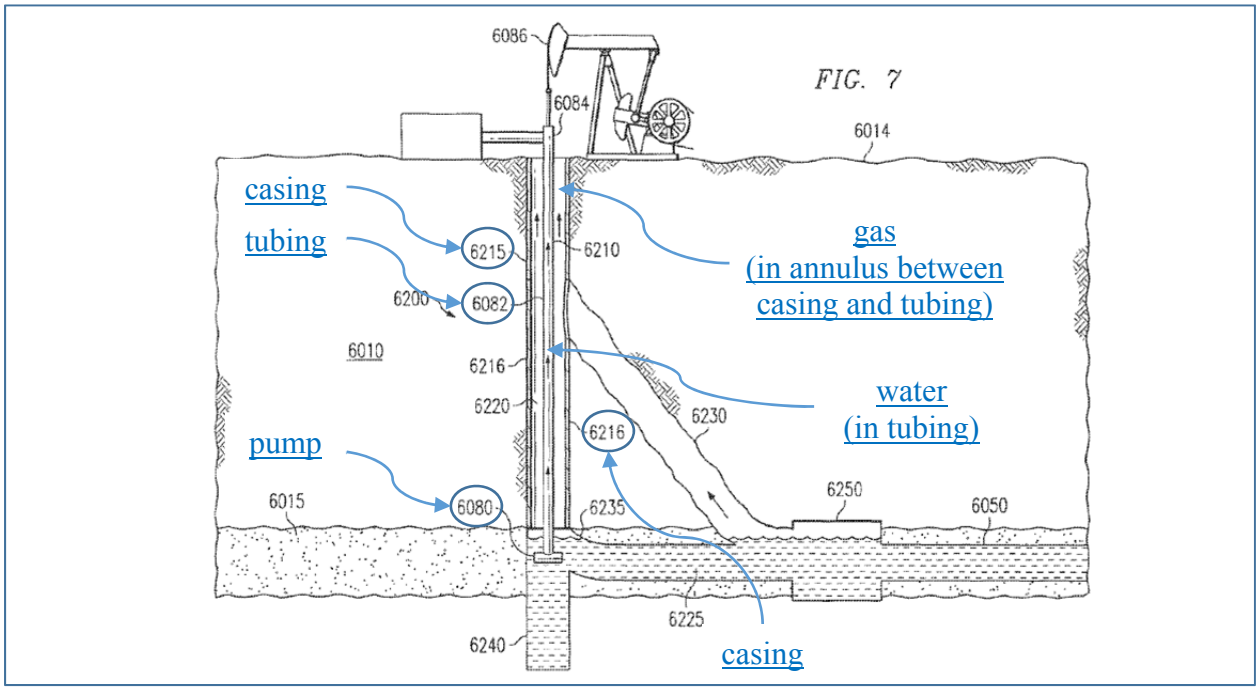
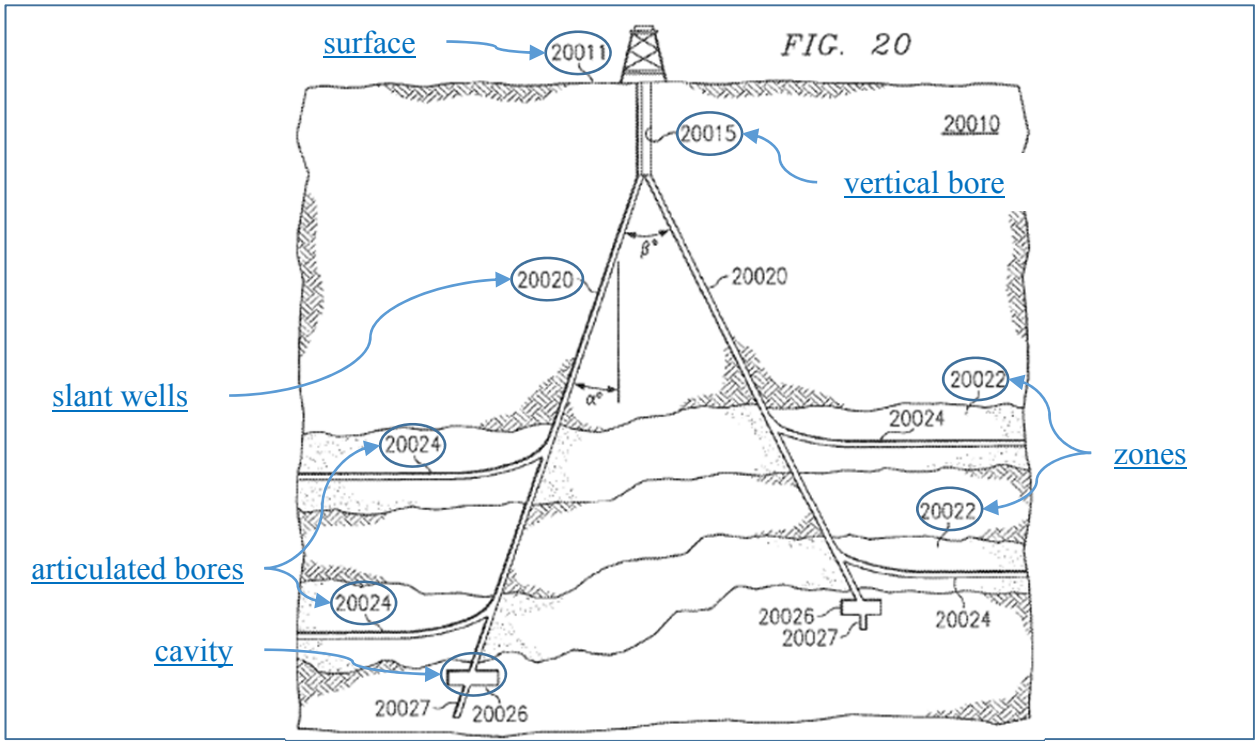


Figure 7 depicts the system of Figure 6 as configured for production. Fluids are produced from the zone by: (1) pumping water to the surface through a tubing string (6082) using a downhole pump (6080), and (2) allowing natural gas to flow to the surface in the annulus between the tubing string and casing (6215, 6216) in the vertical bores. '840 Patent col.23 l.9–col.25 l.53.

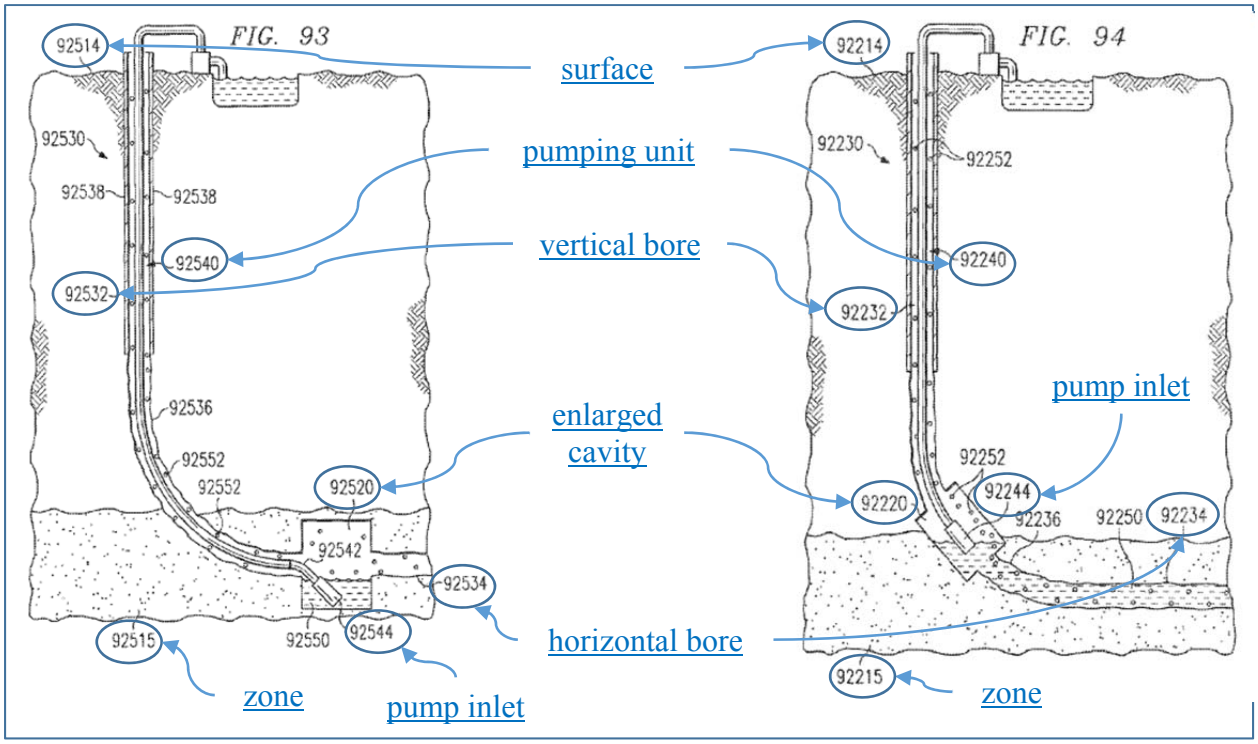


Another example of a multi-bore well is shown in Figure 20, which is reproduced below and annotated by the Court. The figure depicts articulated bores (20024) in zones (20022). The articulated bores extend from slant bores (20020) which in turn extend from a single vertical entry bore (20015) that extends from the surface (20011) toward the zone. '840 Patent col.38 l.61–col.39 l.42.

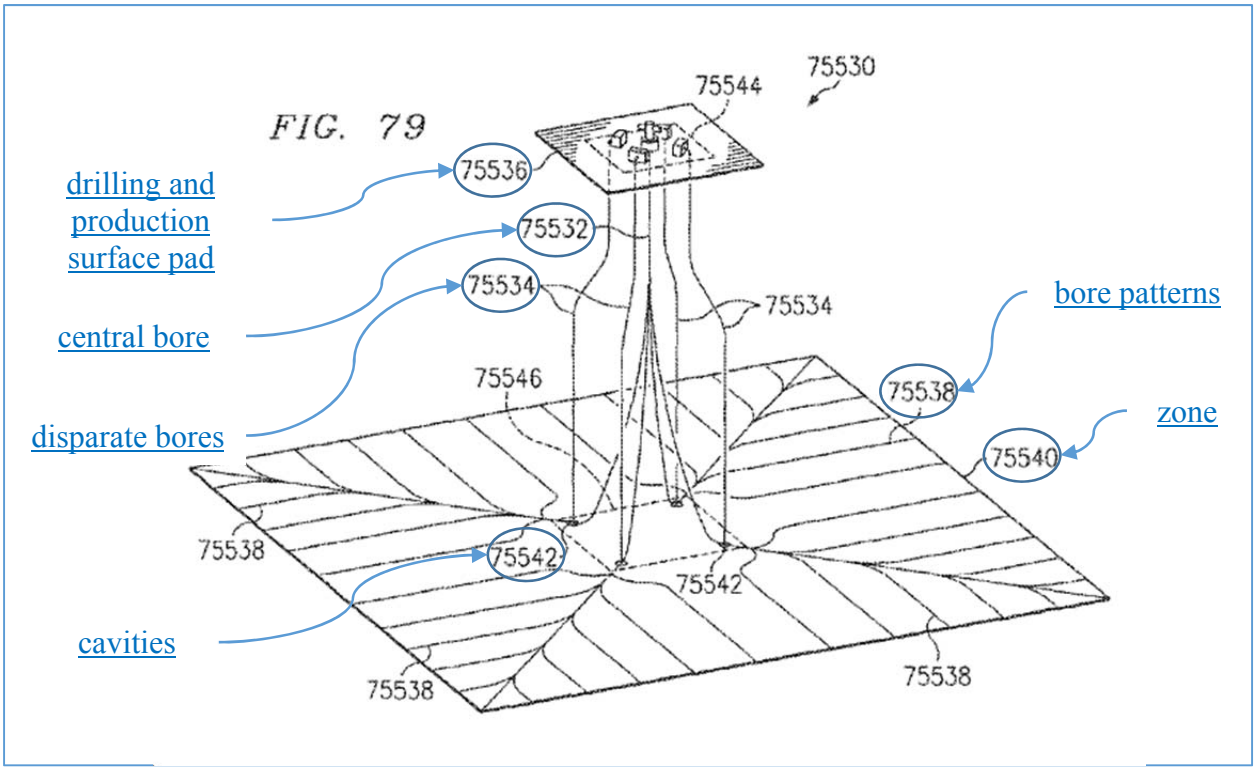


Examples of single-well systems configured for production are shown in Figures 93 and 94, which are reproduced below and annotated by the Court. Figure 93 depicts a system with a vertical bore (92532) extending from the surface (92514) to the zone (92515). The vertical bore is connected to a horizontal bore (92534). The horizontal bore includes an enlarged cavity (92520) in the zone (92515). A pumping unit (92540) is disposed in the well with the pump inlet (92544) located in the cavity such that it does not capture the zone's natural gas (as separated from the other fluids) but pumps other fluids (92550) to the surface through the bores. The natural gas is allowed to flow to the surface. Figure 94 depicts a system similar to that of Figure

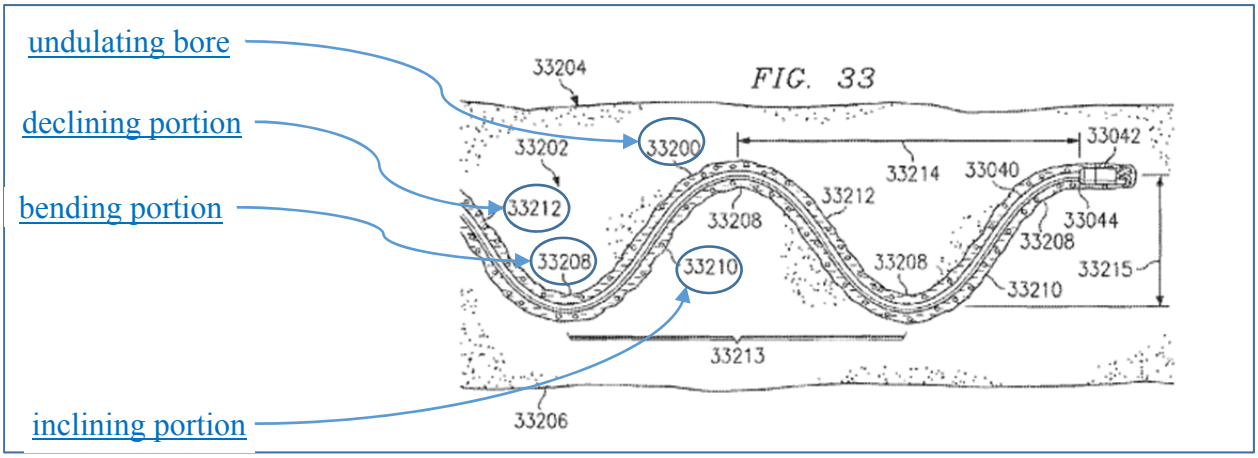
93 with the main difference being the location of the cavity. The cavity (92220) of Figure 94 is located in the curved bore (92236) that connects the vertical (92232) and horizontal (92234) bores. '840 Patent col.110 l.1–col.111 l.24.



An example of a multi-well system with a specific drainage bore pattern is shown in Figure 79, which is reproduced below and annotated by the Court. This figure depicts a system of wells (75532, 75534) extending from a single drilling and production pad at the surface (75536) to the target zone underground (75540). A system of bores extending from a central well (75532) intersects with bores (75534) extending from disparate locations on the surface pad. There is a cavity (75542) at each junction of central-well bore and disparate-well bore. Each cavity is connected to a drainage bore pattern (75538). This configuration is meant to allow access to a large drainage area from a small surface area. '840 Patent col.94 l.53–col.96 l.8; *see also*, *id*. at col.38 ll.24–59 & fig.19.



An example of an undulating bore is shown in Figure 33, which is reproduced below and annotated by the Court. This figure depicts an undulating bore (33200) "that may be included as any well bore of the systems illustrated in FIGS. 1 through 24 or a well bore of any other system that may be used to remove and/or produce water, hydrocarbons and other fluids in a layer of subterranean deposits." The undulating bore includes a declining portion (33212), a bending portion (33208), and an inclining portion (33210). The wavelength (33214) of the undulating bore is the distance between successive like points on the bore, for example, the distance from one point where the bending portion couples to the inclining portion to the next point along the path of the bore where the bending portion couples to the inclining portion. '840 Patent col.51 l.5–col.53 l.10; *see also*, *id*. at col.53 ll.11–44 & fig.34.



Independent claims 1[2] and 18, both asserted by Plaintiff, recite as follows:

1. A system for accessing a subterranean zone of shale, the system comprising:

a drilling pad at a surface;

a first wellbore extending from the surface con g a first substantially vertical portion extending into a subterranean zone and a first substantially horizontal drainage bore extending from the first substantially vertical portion and proximate to the subterranean zone;

a second wellbore extending from the surface compromising a second substantially vertical portion extending into the subterranean zone and a second substantially horizontal drainage bore extending from the second substantially vertical portion and proximate to the subterranean zone, wherein the first and second substantially horizontal drainage bores extend in the subterranean zone in different directions from each other;

a third wellbore extending from the surface comprising a third substantially vertical portion extending into the subterranean zone and a third substantially horizontal drainage bore extending from the third substantially vertical portion and proximate to the subterranean zone;

a fourth wellbore extending from the surface comprising a fourth substantially vertical portion extending into the subterranean zone and a fourth substantially horizontal drainage bore extending from the fourth substantially vertical portion and proximate to the subterranean zone, wherein the third and fourth substantially horizontal drainage bores extend in the subterranean zone in different directions from each other;

the first, second, third and fourth wellbores each extending from non-common surface locations on the drilling pad at the surface, the surface locations closely spaced to each other on the drilling pad;

wherein the subterranean zone is shale; and,

wherein the first, second, third, and fourth wellbores each produce a fluid extracted from the subterranean zone through the substantially horizontal drainage bores.

18. A system for accessing a shale subterranean zone, the system comprising:

a drilling pad at a surface, which is land;

a first well comprising a first wellbore with a first substantially vertical portion extending into a shale subterranean zone, and a first substantially horizontal drainage bore extending from the first substantially vertical portion;

a second well comprising a second wellbore with a second substantially vertical portion extending into the shale subterranean zone, and a second substantially horizontal drainage bore extending from the second substantially vertical portion, wherein the first and second substantially horizontal drainage bores extend in the shale subterranean zone in substantially opposite directions;

a third well comprising a third wellbore with a third substantially vertical portion extending into the shale subterranean zone, and a third substantially horizontal drainage bore extending from the third substantially vertical portion;

a fourth well comprising a fourth wellbore with a fourth substantially vertical portion extending into the shale subterranean zone, and a fourth substantially horizontal drainage bore extending from the fourth substantially vertical portion, wherein the third and fourth substantially horizontal drainage bores extend in the shale subterranean zone in substantially opposite directions;

the first, second, third and fourth wellbores each having a non-common surface location on the drilling pad at the surface, the surface locations closely spaced to each other on the drilling pad;

wherein each wellbore is coupled to at least one of the first, second, third, and fourth substantially horizontal drainage bores at a junction proximate to the shale subterranean zone; and,

wherein each wellbore produces a fluid originating from the shale subterranean zone.

[2] A printing error in Claim 1, "con g," was corrected to "comprising" in a January 6, 2015 Certificate of Correction.

II. LEGAL PRINCIPLES

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To determine the meaning of the claims, courts start by considering the intrinsic evidence. *See id*. at 1313; *see also C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312-13; *accord Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id.* Other asserted or unasserted claims can aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term's meaning. *Id.* For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id.* at 1314–15.

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id*. at 1315 (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). "[T]he specification 'is always highly relevant to the claim construction analysis.

Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *accord Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id.* The specification may also resolve the meaning of ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex*, 299 F.3d at 1325. But, "[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims." *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *accord Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc., v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent."). "[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance." *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985).

Although extrinsic evidence can be useful, it is "less significant than the intrinsic record in determining the legally operative meaning of claim language." *Phillips*, 415 F.3d at 1317 (citations and internal quotation marks omitted). Technical dictionaries and treatises may help a

court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id.* at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are entirely unhelpful to a court. *Id.* Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.* The Supreme Court recently explained the role of extrinsic evidence in claim construction:

> In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period. *See, e.g., Seymour v. Osborne*, 11 Wall. 516, 546 (1871) (a patent may be "so interspersed with technical terms and terms of art that the testimony of scientific witnesses is indispensable to a correct understanding of its meaning"). In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the "evidentiary underpinnings" of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal.

Teva Pharm. USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 841 (2015).

The "determination of claim indefiniteness is a legal conclusion that is drawn from the Court's performance of its duty as the construer of patent claims." *Exxon Research & Eng'g Co. v. United States*, 265 F.3d 1371, 1375 (Fed. Cir. 2001). Section 112 entails a "delicate balance" between precision and uncertainty:

> On the one hand, the definiteness requirement must take into account the inherent limitations of language. Some modicum of uncertainty, the Court has recognized, is the price of ensuring the appropriate incentives for innovation. . . . At the same time, a patent must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them. Otherwise there would be a zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims. And absent a meaningful definiteness check, we

> are told, patent applicants face powerful incentives to inject ambiguity into their claims. . . . Eliminating that temptation is in order, and the patent drafter is in the best position to resolve the ambiguity in patent claims.

Nautilus Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120, 2128–29 (2014) (citations omitted). Therefore, in order for a patent to be definite under § 112, ¶ 2,[3] "a patent's claims, viewed in light of the specification and prosecution history, [are required to] inform those skilled in the art about the scope of the invention with reasonable certainty." *Id.* at 2129. The determination of "definiteness is measured from the viewpoint of a person skilled in the art at the time the patent was filed." *Id.* at 2128 (emphasis in original, citations omitted). "The definiteness requirement . . . mandates clarity, while recognizing that absolute precision is unattainable." *Id.* at 2129. This standard reflects rulings that have found that "the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter." *Id.* at 2129. When a term of degree is used in a claim, "the court must determine whether the patent provides some standard for measuring that degree." *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015) (quotation marks omitted). Likewise, when a subjective term is used in a claim, "the court must determine whether the patent's specification supplies some standard for measuring the scope of the [term]." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1351 (Fed. Cir. 2005); *accord Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) (citing *Datamize*, 417 F.3d at 1351). "Whether a claim reasonably apprises those skilled in the art of its scope is a question of law." *Microprocessor Enhancement Corp. v. Texas Instruments Inc.*, 520 F.3d 1367, 1374 (Fed. Cir. 2008). As it is a challenge to the validity of a patent, the failure of any claim in suit to comply with § 112 must be shown by clear and convincing evidence. *Nautilus*, 134 S. Ct. at 2130 n.10.

[3] As the '840 Patent has an effective filing date earlier than Sept. 16, 2012, the pre-AIA version of 35 U.S.C. § 112 governs the definiteness analysis here.

III. CONSTRUCTION OF AGREED TERMS

The parties have agreed to the following constructions set forth in their Joint Claim Construction Chart Pursuant to Patent Local Rule 4-5 (Dkt. No. 53):

Term[4]	Agreed Construction
"shale" • Claims 1, 18	"a fine grained sedimentary rock is that is finely laminated, commonly splits among its laminations, and has an appreciable content of clay"
"proximate to the subterranean zone" • Claim 1	"in or near the subterranean zone"
"proximate to the shale subterranean zone" • Claim 18	"in or near the subterranean zone"
"closely spaced" • Claims 1, 18	"on the same drilling pad"
"junction" • Claim 18	"a place where wellbores intersect"

Having reviewed the intrinsic and extrinsic evidence of record, the Court agrees with and hereby adopts the parties' agreed constructions.

IV. CONSTRUCTION OF DISPUTED TERMS

The parties' positions and the Court's analysis as to the disputed terms are presented below.

A. The "Shale Zone" Terms

Disputed Term	Plaintiff's Proposed Construction	Defendant' Proposed Construction

[4] For all term charts in this Order, the claims in which the term is found are listed with the term but: (1) only the highest level term in each dependency chain is listed, and (2) only claims identified in the Joint Claim Construction Chart Pursuant to Patent Local Rule 4-5, Exhibit A (Dkt. No. 53-1) are listed.

Disputed Term	Plaintiff's Proposed Construction	Defendant' Proposed Construction
"subterranean zone of shale" • Claim 1	No construction is necessary. Rather, these terms should be given their plain and ordinary meaning	a distinct layer composed of at least a majority of shale rock
"shale subterranean zone" • Claim 18		
"wherein the subterranean zone is shale" • Claim 1		

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The parties' positions evolved somewhat during the briefing: they reached agreement regarding the meaning of "shale" and Defendants further modified their proposal from "a distinct layer composed ***entirely or*** at least a majority of shale rock" to "a distinct layer composed of at least a majority of shale rock." The Court addresses only the remaining disputes in this order.

The Parties' Positions

Plaintiff submits that the terms carry their full plain and ordinary meaning and that Defendants' proposal that the zone be a "distinct" layer is unclear with respect to what "distinct" means. (Dkt. No. 44 at 13.) Plaintiff argues that under the plain and ordinary meaning, a zone is a "shale zone" if it is comprised primarily of shale. (*Id*. at 16.)

Defendants respond that these terms need to be construed because "some construction of the disputed claim language will assist the jury to understand the claims." (Dkt. No. 46 at 4 (citing *TQP Dev., LLC v. Merrill Lynch & Co., Inc.*, No. 2:08-cv-471, 2012 WL 1940849, at *2 (E.D. Tex. May 29, 2012).) Defendants argue that the meaning of "subterranean zone" has a more specific meaning in the context of geology and the oil-and-gas industry than it may have in

ordinary parlance to a lay jury. (*Id*. at 5.) The meaning of "zone" in this field, Defendants submit, is "a belt, layer, or stratum that is distinguished by content, composition, or characteristic fossils." (*Id*. (citing various general-purpose dictionaries and the Declaration of John Wheeler ("Wheeler Decl.")).) Defendants further argue that this meaning comports with the '840 Patent's discussion of the subterranean zones as delimited structures (*id*. at 5) and with statements by the applicant made during prosecution of the patent to distinguish the extraction of oil from above and below a shale formation from the extraction of oil from a shale formation (*id*. at 5–6). And Defendants argue that the "shale zone" must be a zone comprised mostly of shale, as Defendants' expert, John Wheeler, and Plaintiff's expert, Dr. Enick, purportedly agree. (*Id*. at 6 (citing Wheeler Decl.; Declaration of Dr. Robert M. Enick ("Enick Decl.").) In sum, Defendants conclude that a "shale zone" does not include surrounding layers of rock that are not comprised mostly of shale. (*Id*. at 7.)

In addition to the claims themselves, Defendants cite the following intrinsic and extrinsic evidence to support their position. **Intrinsic evidence**: '840 Patent col.4 ll.45–47, col.12 ll.46–54, col.14 ll.19–20, 47–48, col.21 ll.19–22, col.22 ll.51–52, col.23 ll.4, 12–15, col.24 ll.20–21, col.25 ll.64–67, col.28 ll.1–5, col.29 ll.46–47, col.30 ll.28–30, col.31 ll.50–51, col.38 ll.62–63, col.40 ll.61–67, col.45 ll.58–60, col.51 ll.18–20, fig. 20, fig. 23; '840 Patent File Wrapper, May 16, 2014 Response (Defendants' Ex. 6, Dkt. No. 46-7). **Extrinsic evidence**: *The American Heritage Dictionary of the English Language* (3d ed. 1996) (Defendants' Ex. 2, Dkt. No. 46-3); *The Oxford Modern English Dictionary* (2d ed. 1996) (Defendants' Ex. 3, Dkt. No. 46-4); *Merriam Webster's Collegiate Dictionary* (10th ed. 1997) (Defendants' Ex. 4, Dkt. No. 46-5); Wheeler Decl. (Defendants' Ex. 5, Dkt. No. 46-6); Enick Decl. (Defendants' Ex. 7, Dkt. N0. 46-8).

Plaintiff replies that it is unclear how including "distinct" in the construction of the terms would help the fact finder and doing so threatens to improperly limit the terms to some "dogmatic, geological characteristics" and ignores the ability of the formation to produce oil and gas. (Dkt. No. 51 at 2–3.) Plaintiff suggests that Defendants' proposed construction places too much emphasis on rock identification, which is not the field of the '840 Patent's invention, and not enough emphasis on the recovery of subterranean deposits, which is the goal of the invention. (*Id*. at 3.)

Plaintiff cites further **intrinsic evidence** to support its position: '840 Patent col.3 ll.24–27.

Analysis

The dispute here distills to the definition of "zone": the parties agree what "shale" means. So the real dispute here is whether and how a shale "zone" is "distinct." The Court agrees with Defendants' that "zone" implies distinguishable boundaries. In the context of the '840 Patent, those boundaries are the regions that are adjacent to and distinguishable from the zone. But the Court agrees with Plaintiff that Defendants' proposed construction is ambiguous as to how the zone is distinguishable from the adjacent regions. Further, the Court is not persuaded that "zone" and "layer" are used synonymously in the '840 Patent. In light of the intrinsic and extrinsic evidence of record and as explained below, the Court determines that a "shale zone" of the '840 Patent is a depth interval distinguishable from other depth intervals based on the predominant rock-type (shale) of the targeted formation layers.

The '840 Patent uses "zone" to identify the specific region of the sub-surface ground targeted by the bore. Most commonly, "zone" refers to the region from which fluids are extracted. For example, the patent includes the following:

> FIG. 1 illustrates formation of a dual well system 10 for enhanced access to a subterranean, or subsurface, zone from the surface in accordance with an embodiment of the present invention. In this embodiment, the subterranean zone is a tight coal seam having a medium to low permeability. It will be understood that other suitable types of zones and/or other types of low pressure, ultra-low pressure, and low porosity subterranean formations can be similarly accessed using the present invention to lower reservoir or formation pressure and produce hydrocarbons such as methane gas and other products from the zone. For example, the zone may be a shale or other carbonaceous formation.

'840 Patent col.12 ll.43–54. But "zone" also is used to refer to regions targeted for purposes other than production of fluids. For example, the patent includes the following:

> FIG. 5 illustrates a method and system for drilling the well bore pattern 50 in a second subterranean zone, located below the coal seam 15, in accordance with another embodiment of the present invention. . . . In this embodiment, the second subterranean zone is also a coal seam. It will be understood that other subterranean formations and/or other low pressure, ultra low pressure, and low porosity subterranean zones can be similarly accessed using the dual radius well system of the present invention to remove and/or produce water, hydrocarbons and other fluids in the zone, to treat minerals in the zone prior to mining operations, or to inject or introduce a gas, fluid or other substance into the zone.

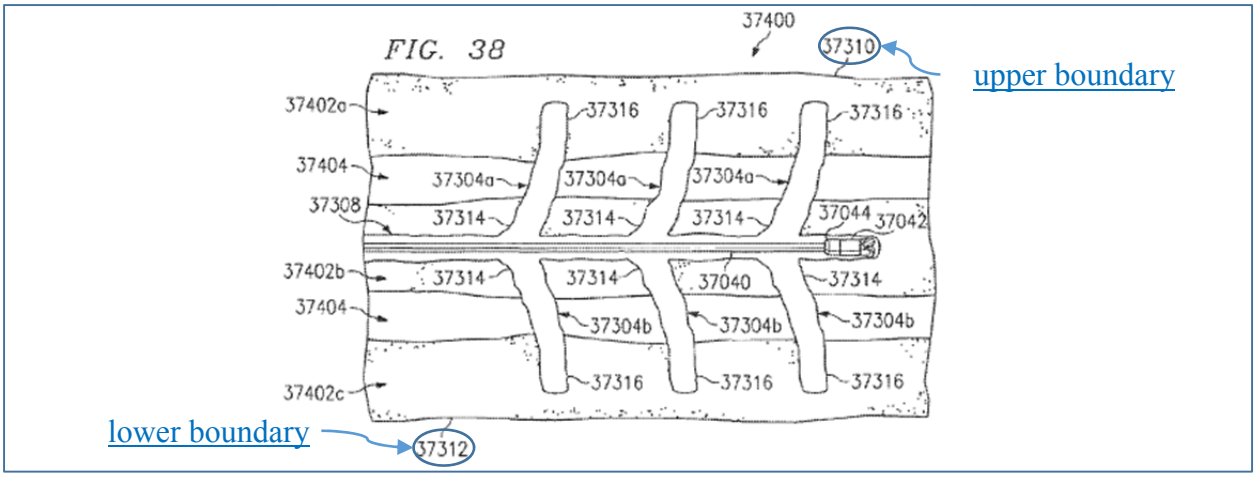
Id. at col.21 ll.13–27.

"Zone" as used in the '840 Patent is not limited to a unitary layer of a particular rock type. Indeed, the patent provides examples of multi-layer, multi-rock zones. For example, with reference to Figure 38 (reproduced and annotated below), the patent describes:

> FIG. 38 is a cross-sectional diagram illustrating an example multi-plane drainage pattern 37400 for accessing deposits in multiple layers 37402 of subterranean deposits. Multi-plane drainage pattern 37400 may provide access to multiple layers 37402 of ***subterranean deposits that may be separated by impermeable or substantially impermeable material 37404 such as sandstone, shale, or limestone***. In this embodiment, substantially horizontal portion 37308, upwardly ramping well bore 37304a, and downwardly ramping well bore 37304b may be formed as previously described in connection with FIG. 37.
>
> Elongated portion 37316 of upwardly ramping well bores 37304a and downwardly ramping well bores 37304b may be of sufficient length to allow multi-plane drainage pattern 37400 to intersect multiple coal seams or ***multiple layers 37402 of any other subterranean zone***. For example, ramping well bores 37304 may extend in a substantially vertical plane to provide access to an upper layer 37402a and a lower layer 37402c. Although only three subterranean layers

> 37402a-c are shown in FIG. 37, multi-plane drainage pattern 37400 ***may intersect any appropriate number of subterranean layers 37402 to effectively drain the subterranean zone***. For example, upwardly ramping well bores 37304a and downwardly ramping well bores 37304b may travel through a number of subterranean layers 37402 separated by multiple layers of impermeable or substantially impermeable material 37404.

Id. at col.59 l.61–col.60 l.20 (emphasis added). In these examples, the "zone" is the aggregate of producing layers (37402) over a distinct depth interval, even with intervening layers. It has an upper layer (37402a) defining the upper boundary (37310) and a lower layer (37402c) defining the lower boundary (37312). *See id*. at col.57 l.66–col.58 l.2, col.59 l.61–col.60 l.20. A similar multi-layer zone is described with reference to Figure 43. *Id*. at col.67 ll.13–49 & fig.43 ("multi-level drainage pattern 42600 may provide uniform access to . . . ***multiple layers 42602 of a coal seam or any other subterranean zone***" (emphasis added)).



In prosecution of the application for the '840 Patent, the applicant distinguished a reference that disclosed a bore that penetrated a "shale formation" on the grounds that the reference described going through the shale to reach the targeted, non-shale, formation—i.e., that the shale was not the "zone." (File Wrapper, May 16, 2014 Response at 11–12 (Defendants' Ex. 6, Dkt. No. 46-7 at 13–14).) The applicant stated:

> While Siebold does mention "shale formations", it is only in the context of shale being an "impervious layer" that prevents the migration of oil between underlying

> layer 3 and overlying layer 2. That is, shale formation 4 (i.e. a non-oil producing layer) must be penetrated by a wellbore 7 in order to reach the oil in producing layers 2 and 3 (col. 2, ln. 13-34). Once again, even if Murray is added to Siebold and Bell, the combination of elements does not explicitly disclose a plurality of wellbores each having a substantially vertical portion ***extracting a liquid from a subterranean zone of shale, as recited in the Applicant's base claims***.
>
> As mentioned above, Bell and Murray do not disclose shale as a producing subterranean zone. However, Siebold actually teaches away from the extraction of oil from a shale formation, stating that oil cannot migrate across a shale formation, and that oil can only be extracted from the layers either above or below a shale formation. Thus, a practitioner using the cited references as a guide could only conclude that it is not practical to form wellbores to ***extract fluids, such as oil or gas, from a subterranean zone of shale, as recited in the claimed invention***.

(*Id*. (emphasis added).) The applicant clearly described the "shale zone" of the '840 Patent according to the ability of shale to produce fluids. This comports with the use of "zone" in the '840 Patent itself. Production from a shale zone requires production from the shale layers—i.e., the fluid extracted from the zone must comprise fluid extracted from the shale layers.

The Court's understanding of the "shale zone" as used in the '840 Patent comports with the extrinsic evidence of record. The extrinsic evidence suggests that a "zone," as used to denote a subterranean geological feature, is a particular range of depths that is distinguishable from adjacent regions based on its constituents. (*See, e.g.*, *Merriam Webster's Collegiate Dictionary* 1377 (10th ed. 1997) (defining "zone" as "a distinctive belt, layer, or series of layers of earth materials (as rock)" and "a region or area set off as distinct from surrounding or adjoining parts") (Defendants' Ex. 4, Dkt. No. 46-5 at 4); *The Oxford Modern English Dictionary* 1211 (2d ed. 1996) (defining "zone" as "a range between specified limits of depth, height, etc., esp. a section of strata distinguished by characteristic fossils") (Defendants' Ex. 3, Dkt. No. 46-4 at 4); *The American Heritage Dictionary of the English Language* 2078 (3d ed.1996) (defining "zone" as "[a] region or stratum distinguished by composition or content") (Defendants' Ex 2, Dkt. No. 46-3).) And the extrinsic evidence suggests that a zone is defined by its most common constituent,

whether or not that constituent comprises a majority of the rock. (*See* A.D. Wilkins, *Terminology and the Classification of Fine Grained Sedimentary Rocks* Figure 4 (Plaintiff's Ex. 7, Dkt. No. 44-9 at 6).) Thus, a "shale zone" is a particular depth interval that is comprised primarily of shale rock.

Accordingly, the Court construes the "Zone" Terms as follows:

- "subterranean zone of shale" means "depth interval including one or more layers of rock composed primarily of shale and that in the aggregate is composed primarily of shale";
- "shale subterranean zone" means "depth interval including one or more layers of rock composed primarily of shale and that in the aggregate is composed primarily of shale"; and
- "wherein the subterranean zone is shale" means "wherein the depth interval includes of one or more layers of rock composed primarily of shale and is in the aggregate composed primarily of shale."

B. "extend in the subterranean zone in different directions from each other"

Disputed Term	Plaintiff's Proposed Construction	Defendant' Proposed Construction
"extend in the subterranean zone in different directions from each other" • Claim 1	No construction is necessary. Rather, this term should be interpreted according to its plain and ordinary meaning.	Indefinite

The Parties' Positions

Plaintiff submits that this term consists of plain words that have not been redefined by the patentee and thus the term should be given its full ordinary meaning. (Dkt. No. 44 at 17.) Plaintiff further submits that the term does not render Claim 1 indefinite because one of skill in

the art would understand that in the context of the patent, well bores extend in "different directions from each other" if the bores are of sufficiently different directions that they drain different areas of the formation. (*Id*. at 18–19 (citing '840 Patent col.38 ll.44–47 & fig.19; Enick Decl.).) Plaintiff argues that to the extent Defendants present the Declaration of Wayman T. Gore ("Gore Decl.," Plaintiff's Ex. 11, Dkt. No. 44-13) as evidence of indefiniteness, such declaration should be discounted as "unsupported, conclusory, and unreliable" at least in part because Mr. Gore's opinion is premised on his belief that the term at issue is not a term of art in the industry and the definiteness of a term does not necessarily hinge on whether the term has special meaning in the art. (*Id*. at 17.)

In addition to the claims themselves, Plaintiff cites the following intrinsic and extrinsic evidence to support its position. **Intrinsic evidence**: '840 Patent col.38 ll.44–47, fig.19. **Extrinsic evidence**: Enick Decl. (Plaintiff's Ex. 6, Dkt. No. 44-8).

Defendants respond that one of skill in the art cannot determine whether bores "extend in . . . different directions" with reasonable certainty and that therefore the term, and the claims within which it is found, are indefinite. (Dkt. No. 46 at 23, 29.) Defendants argue that although exemplary embodiments in the patent show well bores extending in different directions, identification of examples of what meets a claim limitation is not enough to render a claim definite as such examples do not provide sufficient guidance as to what is outside the limitation. (*Id*. at 25.) According to Defendants, "different" is a word of degree and, as such, the patent must provide a standard for measuring that degree, and the patent fails to provide such a standard. (*Id*. at 25–27.) Defendants argue that under the plain meaning of the term "different directions" all well bores necessarily extend in different directions because of the technical limitations of drilling and, therefore, under its plain meaning, the term is improperly read out of the claim

altogether. (*Id*. at 26.) Further, Defendants argue, the patent itself describes embodiments of well bores that are "substantially parallel," meaning not "exactly" parallel, and therefore extend in "different directions" even though one of ordinary skill in the art would not understand them to be in "different directions" in any meaningful way. (*Id*. at 28.) With respect to whether "different" means "different enough to achieve the desired drainage of the target subterranean zone," Defendants respond that "different enough" just adds a layer of subjectivity to the claim term and the patent provides no guidance as to what is "different enough." (*Id*. at 28–29.)

In addition to the claims themselves, Defendants cite the following **intrinsic evidence** to support their position: '840 Patent col.15 ll.12–15, col.20 ll.12–15, col. 45 ll.28–40, col.53 ll.2–10, col.79 ll.53–57.

Plaintiff replies that Defendants have offered only attorney argument, and no evidence, to support their position that the term renders claims indefinite and that attorney argument alone does not meet the clear-and-convincing burden that Defendants must meet. (Dkt. No. 51 at 4.)

Analysis

The dispute here is whether the term "different directions" apprises one of ordinary skill in the art of the scope of the claims with reasonable certainty. The Court determines that Defendants have failed to establish with clear and convincing evidence that the term renders any claim indefinite as the patent provides sufficient guidance as to what constitutes a "different direction."

At the onset, the Court rejects Defendants' contention that the claims all include a central well bore as depicted in Figure 79. At oral argument, Defendants contended that the claimed drainage bores "all come off a single centralized bore." Defendants recognized that the claims do not expressly include such a limitation and instead argued that such a limitation should be

imported from the exemplary embodiments, stating: "And throughout the patent not only in figures 19 and 79 but in, I believe, every single embodiment, you have the horizontal drainage bores. We have multiple horizontal drainage bores branching off of a single well bore that comes down from the surface."

The Court disagrees that every embodiment has "multiple horizontal drainage bores branching off a single well bore that comes down from the surface." The '840 Patent includes embodiments that contradict such a contention. For example, the embodiment of Figure 24F shows multiple articulated bores each coming from a different entry bore. '840 Patent col.44 ll.42–61 & fig.24F. In the similar example of Figure 24G, the patent notes that multiple articulated bores "***may*** initiate from a common surface point." *Id*. at col.45 ll.1–26 & fig.24G (emphasis added). Defendants' argument would import a centralized-entry-bore feature from an embodiment when that feature is expressly described as optional and would exclude the disparate-entry-bore feature described in a separate embodiment. The Court expressly rejects Defendants' argument to import a centralized-bore limitation. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (stating that "although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments" and "we have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment"); *MBO Labs., Inc. v. Becton, Dickinson & Co.*, 474 F.3d 1323, 1333 (Fed. Cir. 2007) ("A claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct." (quotation marks omitted)).

As Defendants recognize, the patent states that the technical limitations of bore drilling inevitably result in a drilled bore that deviates from the intended direction. (Dkt. No. 46 at 26

(citing ’840 Patent col.53 ll.2–10).) The Court agrees with Defendants that because of this technical limitation, it is very unlikely that any two wells would be in exactly the same direction and therefore that, coincidence aside, every bore is directed in a different direction from every other bore if measured with an expectation of absolute precision and accuracy. But Defendants’ argument fails because the measure of “different” in the industry is not so exacting as Defendants posit. The patent states,

> One of ordinary skill in the art may appreciate that a smooth and wavelike form may include ***normal inaccuracies of drilling***. Because operation of a drill string 3340 through a layer 33202 of subterranean deposits may not be visually monitored, inaccuracies may result in the positioning of the drill bit 3344. As a result, drill string 3340 may vary slightly from the operator's intended path.

’840 Patent col.52 l.67–col.53 l.10 (emphasis added). Thus, one of ordinary skill in the art would understand two wells to be in the same direction if they are in the same direction within the normal inaccuracies of drilling. Further, determining direction inherently requires measurement of some type, so one of ordinary skill in the art would take into account the precision of the measurement. *See, e.g., id*. at col.29 ll.35–40 (describing using a “measurement while drilling (MWD) device” to control “orientation and direction” of the drilled bore). Without more, one of ordinary skill in the art would understand bores to extend in “different directions” if they extend in different directions within the technical limitations of drilling; i.e., different within a margin of error and precision that one of ordinary skill in the art of directional well drilling would know. At oral argument, Plaintiff clarified that it does not contend that parallel bores are in “different directions,” but stated that what constitutes “different directions” cannot be determined based on a “simple angular measurement.”

It is important to consider that the claimed bores that extend in different directions are “drainage bores,” and that the ’840 Patent provides guidance as to what constitutes “different directions” for drainage bores. The definiteness of a claim is determined in light of the entire

specification, not in a vacuum. *Nautilus Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2128 (2014) ("[I]n assessing definiteness, claims are to be read in light of the patent's specification and prosecution history"); *see also*, *Ultimax Cement Mfg. Corp. v. CTS Cement Mfg. Corp.*, 587 F.3d 1339, 1353 (Fed. Cir. 2009) ("Claim definiteness is analyzed not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art." (quotation marks omitted)); *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015) ("When a word of degree is used, the court must determine whether the patent provides some standard for measuring that degree." (quotation marks omitted)). And the intrinsic record supports Plaintiff's position that the drainage bores are directed differently to drain different areas of the zone—they are directed to different drainage regions. (Dkt. No. 44 at 18–19.)

The '840 Patent provides a standard for "different directions" of drainage bores that goes beyond just the technical uncertainty of directional drilling of bores—the direction of a drainage bore is based on the drainage characteristics of the zone. Claim 1, the claim that includes the "different directions" limitation, recites: "a first substantially horizontal ***drainage*** bore," "a second substantially horizontal ***drainage*** bore," and "wherein the first and second substantially horizontal ***drainage*** bores extend in the subterranean zone in different directions from each other." '840 Patent col.119 ll.54–64 (emphasis added). The claim similarly recites third and fourth drainage bores that extend in different directions from each other. *Id*. at col.119 l.67–col.120 l.10. From the plain language of the claims in the context of the entire specification, one of ordinary skill in the art would understand the purpose of the differently directed bores—the drainage bores—is drainage of the subterranean zone.

"Drainage bores" are described in the '840 Patent as directed "to provide substantially uniform coverage of a desired area within the [zone]." '840 Patent col.14 ll.48–53. The patent explains that the spacing and orientation of the drainage bores depend on "the characteristics of a particular subterranean resource." *See, e.g.*, '840 Patent col.45 ll.28–40. In one example, the patent provides exemplary drainage bore patterns for a zone comprising a "tight coal seam having a medium to low permeability." '840 Patent col.12 ll.42–47, col.14 l.44–col.15 l.17. The exemplary drainage bores for such a zone have "disparate orientations" so as to intersect a desired percentage of fractures in zone. *Id*. at col.14 l.44–col.15 l.17. "The percentage of the bores having disparate orientations is significant when twenty-five to seventy-five percent of the bores have an orientation at least twenty degrees offset from other bores of the pattern." *Id*. at col.15 ll.5–9. More generally, the patent explains the drainage pattern is a function of the drainage characteristics of the zone:

> The number and spacing of the lateral bores may be adjusted depending on the absolute, relative and/or effective permeability of the [zone] and the size of the area covered by the pattern. The area covered by the pattern may be the area drained by the pattern, the area of a spacing unit that the pattern is designed to drain, the area within the distal points or periphery of the pattern and/or the area within the periphery of the pattern as well as the surrounding area out to a periphery intermediate to adjacent or neighboring patterns.

'840 Patent col.46 ll.19–28; *see also*, *id*. at col.3 l.67–col.4 l.3 (noting the problem of plugging the "pores, cracks, and fractures that are needed to produce the gas"). The patent further explains:

> Permeability is the capacity of a matrix to transmit a fluid and is the measure of the relative ease of fluid flow under an equal pressure drop. Effective permeability is a permeability of the coal or other formation matrix to gas or water and may be determined by well testing and/or long-term trends. For example, effective permeability may be determined by insitu slug tests, injection or draw down tests or other suitable direct or indirect well testing methods. Effective permeability may also be determined based on suitable data and modeling. The effective permeability is the matrix or formation permeability and may change during the life of a well. As used herein, the effective permeability of

> a formation and/or area of a formation is the median or mean effective permeability at substantially continuous flow conditions or simulated substantially continuous flow conditions of a formation or area over the life of the well, or over the period during which a majority of gas in the area is produced. The coal structure 75550 may also have a medium absolute permeability between three and millidarcies or a low absolute permeability below three millidarcies. Absolute permeability is the ability of the matrix to conduct a fluid, such as a gas or liquid at one hundred percent saturation of that fluid. The relative permeability of the formation is the relationship between the permeability to gas versus the permeability to water.

Id. at col.96 ll.26–50; *see also*, *id*. at col.96 l.60–col.97 l.5 (describing fractures as increasing permeability). Thus, the relative directions of the "drainage bores" depend on the targeted drainage area and drainage characteristics (e.g., permeability) of the zone.

The extrinsic evidence submitted in support of argument on this point, the declaration of Plaintiff's expert Dr. Enick, comports with the intrinsic evidence as set forth above. He understood that the '840 Patent described "'drainage patterns' that can be employed to provide 'generally uniform access to a relative large subterranean zone'" and therefore drainage bores extend in "different directions" if they drain different areas. (Enick Decl. ¶ 18 (quoting '840 Patent col.38 ll.38–59 & fig.19) (Plaintiff's Ex. 6, Dkt. 44-8 at 9–10).)

Given that the intrinsic evidence suggests that "drainage bores" "extend in different directions" in a zone to effect drainage of different regions within the drainage area, and the unrebutted declaration of Dr. Enick supports this understanding, Defendants have failed to establish by clear and convincing evidence that any claim is invalid as indefinite because of the "different directions" term. Accordingly, the Court construes the "different directions" term as follows:

- "extend in the subterranean zone in different directions from each other" means "extend in the subterranean zone directed to different drainage regions within the subterranean zone"

C. "drilling pad"

Disputed Term	Plaintiff's Proposed Construction	Defendant' Proposed Construction
"drilling pad" • Claims 1, 18	A drilling pad, defined in geographic rather than temporal terms, is "the same drilling location where drilling operations are being conducted."	the same drilling location where drilling operations are being conducted

The Parties' Positions

Plaintiff submits that under the intrinsic and extrinsic evidence "drilling pad" refers to a geographic location, and does not include any temporal limitation that would result in a location being a "drilling pad" only when drilling operations are being conducted. (Dkt. No. 44 at 21–22.) Plaintiff argues that to the extent Defendants present the Declaration of Wayman T. Gore ("Gore Decl.," Plaintiff's Ex. 11, Dkt. No. 44-13) as evidence of the meaning of "drilling pad," such declaration should be discounted as "unsupported, conclusory, and unreliable." (*Id*.) Plaintiff further argues that the plain reading of the claim language itself dictates that there is no temporal aspect to the meaning of "drilling pad" since the claims use the limitation to orient things spatially, not temporally, and because the claims require that the wells be productive and it is nonsensical to require simultaneous drilling and production. (*Id*. at 21–22.)

In addition to the claims themselves, Plaintiff cites the following intrinsic and extrinsic evidence to support its position. **Intrinsic evidence**: '840 Patent col.41 ll.35–37. **Extrinsic evidence**: U.S. Energy Information Administration, *Today in Energy, Pad Drilling and Rig Mobility Lead to More Efficient Drilling* (Sept. 11, 2012) (Plaintiff's Ex. 1, Dkt. No. 44-3).

Defendants respond that the patentee specially defined "drilling pad" as the "same location where drilling operations are being conducted." (Dkt. No. 46 at 7.) Defendants further respond that the special definition of "drilling pad" comports with the ordinary meaning of the

term in the oil-and-gas industry. (*Id*. at 8.) And Defendants argue that "drilling pad" is consistently used in the patent to describe a location where drilling operations are ongoing. (*Id*. at 8–10). With respect to contemporaneous drilling and production, Defendants argue that the claimed production may occur while drilling equipment is located at the surface, that the "production" requirement of the claims requires production of a fluid and is not limited to production of oil or gas, and that the patent itself describes producing water and drilling mud during the drilling operation. (*Id*. at 10–11.)

In addition to the claims themselves, Defendants cite the following intrinsic and extrinsic evidence to support their position. **Intrinsic evidence**: '840 Patent col.16 ll.13–17, 57–60, col.21 ll.24–26, col.22 ll.62–col.23 l.7, col.24 ll.61–62, col.38 ll.44–45, col.44 ll.42–45. col.94 ll.57–58, col.95 ll. 29–30, 34–36, 46–49, fig.2, fig.5, fig.23A. **Extrinsic evidence**: Norman J. Hyne, *Dictionary of Petroleum Exploration, Drilling & Production* (2d ed. 2014) (Defendants' Ex. 8, Dkt. No. 46-9); R. D. Langenkamp, *Handbook of Oil Industry Terms & Phrases* (6th ed. 2014) (Defendants' Ex. 9, Dkt. No. 46-10); Gore Decl. (Defendants Ex. 10, Dkt. No. 46-11).

Plaintiff replies to reiterate that the '840 Patent does not set forth a special definition of "drilling pad" that includes a temporal aspect. (Dkt. No. 51 at 6–7.)

Plaintiff cites further **intrinsic evidence** to support its position: '840 Patent col.41 ll.35–37, 56–57, fig.23B.

Analysis

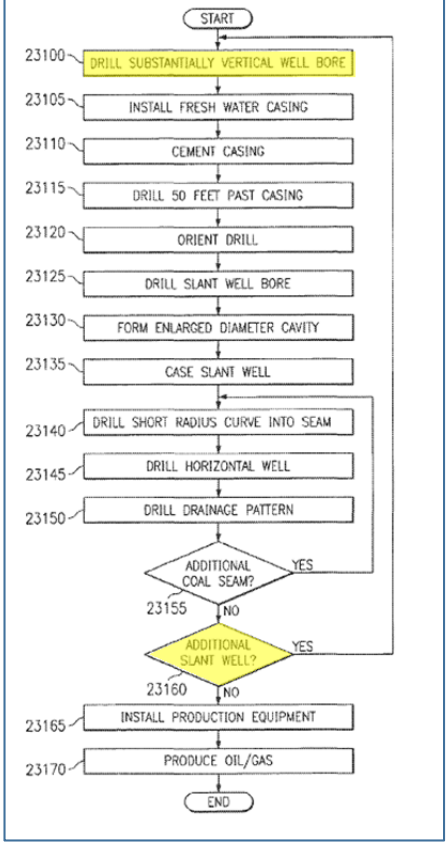
The parties agree that the "drilling pad" is a specific location on the surface from which drilling operations proceed. The dispute is whether the specific location ceases to be a "drilling pad" once drilling operations are complete. The Court is not persuaded by Defendants' argument to read in an "only during drilling operations" temporal limitation.

The statement in the ’840 Patent that Defendants contend is an express, temporal, definition of “drilling pad” is better understood in context as a discussion of the process to create the system depicted in Figure 23A—it does not expressly define “drilling pad” as existing only at a particular time:

> In FIG. 23[A], entry well bores 23015 . . . are formed at the surface at a distance of β feet apart. . . . In some embodiments, entry well bores 23015 may be between two feet and one hundred feet apart. In some embodiments, the entry well bores 23015 may be located on the same drilling pad. As used herein, “on the same drilling pad” means located at the same drilling location where drilling operations are being conducted. In some embodiments entry well bores 23015 are closely spaced together. As used herein, “closely spaced” means on the same drilling pad.

’840 Patent col.41 ll.7–39. The process of forming the slant well system of Figure 23A is described with reference to the flow chart of Figure 23B, reproduced here and annotated by the Court. The first step in the process is to form the entry well bore: “DRILL SUBSTANTIALLY VERTICAL WELL BORE.” *Id*. at col.41 ll.57–58 (“The method begins at step 23100 wherein an entry well bore is formed.”) The process continues through several drilling steps and once the drainage pattern corresponding to the entry bore has been drilled, determines whether another entry bore needs to be drilled:

FIG. 23B



> At decisional step 23160, a determination is made whether additional slant wells are required. If additional slant wells are required, the process returns along the Yes branch to step 23100 and repeats through step 24155. A separate entry well bore may be formed for each individual slant well bore.

Id. at col.41 l.63–col.42 l.34. If additional entry bores are required, then the process returns to the first step, and the additional entry bore is formed—and located—as described above with respect

to Figure 23A. *Id*. at col.42 ll.26–34. If no additional entry bores are required, drilling is complete, and the production equipment is installed and production begins. *Id*. at col.42 ll.35–39. These passages taken together show that the "drilling pad" is not about the timing of the drilling operation, it is about the location of the entry bores, where they are formed and where they continue to be located after the drilling operation is complete. And they are located on the same drilling pad if they are ***formed*** at the same location where the drilling-operations of the slant-well-forming process are ongoing.

That a "drilling pad" is a location and not a point in time is further supported by the use of the term elsewhere in the patent. For example, a drilling pad (24092) is shown in Figure 24F to denote the location of entry bores—and the figure depicts the ***completed*** drainage pattern, after drilling is complete. '840 Patent col.44 ll.43–61 & fig.24F. Likewise, a drilling pad is shown in Figure 79, and the term is used synonymously with "drilling and production pad" and "surface pad" to denote a spacing of the well bores at the surface. *See id*. at col.95 ll.24–55. Figure 79, like Figure 24F, depicts a completed drainage pattern, after drilling is complete.

The extrinsic evidence does not support the narrow definition that Defendants' advocate. For example, the *Handbook of Oil Industry Terms & Phrases* defines "drilling pad" as: "The area on which the drilling rig and associated equipment sits while a well is being drilled. It is usually bulldozed, cleared and leveled in preparation for the rig and the drilling and completion operations." (R.D. Langenkamp, *Handbook of Oil Industry Terms & Phrases* 362 (6th ed. 2014) (Defendants' Ex. 9, Dkt. No. 46-10 at 4).) There is no clear temporal limitation in this definition. The pad is a location suitable for a specific use, it exists before that use (in "preparation"), and there is no indication that is ceases to exists once it has been used. And according to this definition, a "drilling pad" is not limited to drilling operations, it includes at least completion

operations. Further, the U.S. Energy Information Administration broadly defines "drilling pad" as "a location which houses the wellheads for a number of horizontally drilled wells." (*Today in Energy, Pad Drilling and Rig Mobility Lead to More Efficient Drilling* (Sept. 11, 2012) (Plaintiff's Ex. 1, Dkt. No. 44-3 at 2), available at http://www.eia.gov/todayinenergy/detail.cfm?id=7910.) Thus, it is the wellheads, not the drilling equipment, that define the drilling pad location.

Defendants make two unsupported contentions that the Court rejects. First, Defendants contend that "it is common practice to abbreviate longer terms in specifications," such that "drilling pad" at one point means that drilling operations are ongoing and at other points means "drilling and production pad" or "surface pad" and presumably does not carry the ongoing-drilling-operation meaning. If "drilling pad" is specially defined in the patent, it carries that meaning throughout the patent else there is not the requisite "clear" definition. *See Abbott Labs. v. Syntron Bioresearch, Inc.*, 334 F.3d 1343, 1355 (Fed. Cir. 2003) ("Because the specification provides two alternative definitions for the term at issue, the specification does not define the claim term."). The better understanding of the multiple uses of "drilling pad" is that it is not specially defined as Defendants posit, but that it refers to a single location at the surface where various operations (e.g., drilling, completions, production) are performed because the wellheads are located there. Second, Defendants contend that a drilling pad is significantly different than a production pad because of the nature of the equipment, but offers no evidence by which the Court can determine the accuracy of this statement. And the contention runs contrary to the intrinsic and extrinsic evidence, which suggests that a drilling pad is used for more than just drilling operations.

Finally, the Court rejects Defendants' arguments that the '840 Patent's examples of drilling-mud-circulation satisfy the "production" limitations of the claims such that drilling and production may be contemporaneous. (Dkt. No. 46 at 10–11.) Defendants citation of Figure 5 and accompanying text to support its contention is unavailing. Figure 5 depicts a drilling system used to prevent damage to the zone by managing the pressure exerted by the drilling mud on the zone. *See* '840 Patent col.22 l.22–col.23 l.7 ("This [circulation system] eliminates the friction of air and fluid returning up the articulated well bore 30 and reduces down hole pressure to nearly zero. Accordingly, coal seams and other subterranean zones having ultra low pressures below 150 psi can be accessed from the surface.") The use of drilling mud in drilling the wells of Figure 5 works in the same manner as that described with reference to Figure 1. *Id*. at col.22 ll.63–64. The mud system described with reference to Figure 1 is described as follows:

> During the process of drilling the well bore pattern 50, drilling fluid or "mud" is pumped down the drill string 40 and circulated out of the drill string 40 in the vicinity of the bit 42, where it is used to scour the formation and to remove formation cuttings. The cuttings are then entrained in the drilling fluid which circulates up through the annulus between the drill string 40 and the walls of well bore 30 until it reaches the surface 14, where the cuttings are removed from the drilling fluid and the fluid is then recirculated. This conventional drilling operation produces a standard column of drilling fluid having a vertical height equal to the depth of the well bore 30 and produces a hydrostatic pressure on the well bore 30 corresponding to the well bore 30 depth. Because coal seams 15 tend to be porous and fractured, they may be unable to sustain such hydrostatic pressure, even if formation water is also present in the coal seam 15. Accordingly, if the full hydrostatic pressure is allowed to act on the coal seam 15, the result may be loss of drilling fluid and entrained cuttings into the formation. Such a circumstance is referred to as an over-balanced drilling operation in which the hydrostatic fluid pressure in the well bore 30 exceeds the ability of the formation to withstand the pressure. Loss of drilling fluids and cuttings into the formation not only is expensive in terms of the lost drilling fluids, which must be made up, but it also tends to plug the pores in the coal seam 15, which are needed to drain the coal seam 15 of gas and water.

Id. at col.15 ll.29–37. The system of Figure 5 addresses the over-balanced problem by using a pump "to pump drilling fluid and cuttings to the surface." *Id*. at col.22 l.66–col.23 l.1. Using a

downhole pump to circulate drilling mud pumped down the drill string from the surface is not producing "a fluid extracted from the subterranean zone" (Claim 1) or "a fluid originating from the shale subterranean zone" (Claim 18). As set forth above in the discussion of the "shale zone" terms, the fluid extracted from the shale zone must comprise fluid extracted from the shale layers. And as set forth above in the discussion of Figures 23A and 23B, producing zone-originating fluids, be they water, oil, or gas, comes after drilling. Compare Figure 1, "illustrating formation of a well bore pattern," *id*. at col.6 ll.66–67, with Figure 3, "illustrating production of fluids from a well bore pattern," *id*. at col.7 ll.7–8. Thus, the '840 Patent's claims' reference to production further supports that "drilling pad" exists beyond the drilling operation.

Accordingly, the Court rejects Defendants' proposed temporal limitation and construes "drilling pad" as follows:

- "drilling pad" means "the same drilling location where drilling operations are being conducted."

D. "substantially vertical" and "substantially horizontal"

Disputed Term	Plaintiff's Proposed Construction	Defendant' Proposed Construction
"substantially vertical" • Claims 1, 18	substantially perpendicular to the target zone	extending in a direction that lies within 30 degrees of vertical and that is not slanted, undulating, inclined, declined, curved, or radiused
"substantially horizontal" • Claims 1, 18	substantially aligned with the target zone	extending in a direction that lies within 2.5 degrees of horizontal and that is not slanted, undulating, ramping, curved, or radiused

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Plaintiff submits that its proposed constructions are the constructions adopted by the U.S. District Court for the Western District of Pennsylvania for patents related to the '840 Patent in *Effective Exploration, LLC v. Pennsylvania Land Holdings Company LLC et al.*, No. 14-cv-00845 (June 16, 2015) (adopting the Special Master's Report and Recommendation on Claim Construction). (Dkt. No. 44 at 8–9, 22, 26.) Plaintiff argues that in all material respects the intrinsic record for the '840 Patent is the same as for the patents construed in *Pennsylvania Land Holdings Company* ("*PLHC*") and that the terms should here be construed as they were in *PLHC*. (*Id*. at 23, 26.) Plaintiff argues that the '840 Patent uses "vertical" and "horizontal" to describe a direction relative to the plane of target zone, with "vertical" being perpendicular to the zone and "horizontal" being in-line with the zone. (*Id*. at 23–24, 26.) Plaintiff argues that the '840 Patent uses "substantially" to capture the full scope of the invention's intended functionality and thus a "vertical" bore may include a "suitable slope" and a "horizontal" bore may "undulate." (*Id*. at 23–24.) Plaintiff further submits that Defendants' proposed constructions are improperly narrowing, and that the applicant's prosecution-history statements are not disclaimers that justify Defendants' proposals. (*Id*. at 24–27.)

In addition to the claims themselves, Plaintiff cites the following intrinsic and extrinsic evidence to support its position. **Intrinsic evidence**: '840 Patent col.13 ll.44–58, col.56 ll.24–28, col.57 ll.25–30; '840 Patent File Wrapper, April 2, 2014 Response (Plaintiff's Ex. 12, Dkt. No. 44-14), April 25, 2014 Response (Plaintiff's Ex. 13, Dkt. No. 44-15). **Extrinsic evidence:** Special Master's Report and Recommendation on Claim Construction, *Effective Exploration,*

LLC v. Pennsylvania Land Holdings Company LLC et al., No. 14-cv-00845 (W.D. Penn. May 8, 2015) (Plaintiff's Ex. 2, Dkt. No. 44-4).

Defendants respond that "vertical" and "horizontal" are everyday well-understood words and that "substantially" recognizes that well bores are not drilled with mathematical precision. (Dkt. No. 46 at 12.) Defendants argue that Plaintiff's proposed constructions, defining "vertical" and "horizontal" with respect to the plane of the target zone, complicates the infringement analysis, are technically impractical, and are logically absurd. (*Id*.) Defendants argue that "vertical" and "horizontal" bores are distinguished in the '840 Patent from bores of other angles (e.g., slanted, inclined, declined) and from those that are not straight (e.g., radiused, curved, undulated). (*Id*. at 14–19.) Defendants further argue that the applicant disavowed certain bore angles in the course of prosecution, and that in doing so it referred to absolute angles, not angles relative to the target zone. (*Id*. at 19–22.)

In addition to the claims themselves, Defendants cite the following **intrinsic evidence** to support their position: '840 Patent col.13 ll.41–58, col.22 ll.1–3, col.29 ll.7–11, col.39 ll.60–61, col.51 ll.7–9, 16–18, col.50 ll.47–50, col.53 ll.45–62, col.55 ll.56–65, col.56 ll.54–59, col.58 ll.12–16, 20–22, col.76 l.61–col.77 l.1, col.77 ll.34–39, col.104 ll.12–15, col.108 ll.55–58, col.111 ll.55–62, col.114 ll.52–56; '840 Patent File Wrapper, Oct. 11, 2013 Office Action (Defendants' Ex. 11, Dkt. No. 46-12), April 2, 2014 Response (Defendants' Ex. 12, Dkt. No. 46-13), April 16, 2014 Office Action (Defendants' Ex. 13, Dkt. No. 46-14), May 16, 2014 Response (Defendants' Ex. 6, Dkt. No. 46-7).

Plaintiff replies that well bores are typically drilled to provide the shortest distance from the target zone to the surface and that this necessarily means the bore is drilled perpendicular to the target zone, as determined in *PLHC*. (Dkt. No. 51 at 7.) Plaintiff further replies that while the

’840 Patent distinguishes a “horizontal” bore from an “undulating” bore, it is distinguishing a bore that follows the contours of the target zone (the “horizontal” bore) from a bore that is undulated within and relative to a target zone or to span multiple zones (the “undulating” bore). (*Id*. at 8.) And Plaintiff further replies that prosecution statements that Defendants posit as a disclaimer distinguishes the prior art not on bore angle, but on the number of horizontal bores, and thus does not limit the bore angles as Defendants propose. (*Id*. at 9–10.)

Plaintiff cites further intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: ’840 Patent col.22 ll.50–52, col.51 ll.20–30, fig.34, fig.61. **Extrinsic evidence**: U.S. Patent 4,773,488 (Plaintiff’s Reply Ex. 1, Dkt. No. 51-2).

Analysis

There are three disputes with respect to these terms: (1) what direction is “vertical” and what does it mean to be “substantially” oriented in that direction; (2) what direction is “horizontal” and what does it mean to be “substantially” oriented in that direction; and (3) whether horizontal and vertical bores are precluded from also being certain other types of bores.

Substantially Horizontal. The Court is not persuaded that “horizontal” in the context of the ’840 Patent means “aligned with the target zone” regardless of the dip of the zone. Plaintiff relies heavily on the *PLHC* construction of this term in related patents. But that construction is not binding on this Court, and it is questionable because of the arguments there presented regarding “horizontal.” Plaintiff there represented to the court that

> patentee viewed the phrase “substantially horizontal” to be read in light of the purpose of the invention, which is to provide well bores that access a significant length of a target coal seam (or other subterranean zone). This requires such well bores to be aligned with and follow along with the typical shapes of such subterranean formations, ***which commonly run in a horizontal direction relative to the surface***.

(Special Master's Report and Recommendation on Claim Construction at 133, *Effective Exploration, LLC v. Pennsylvania Land Holdings Company LLC et al.*, No. 14-cv-00845 (W.D. Penn. May 8, 2015) ("*PLHC* R&R") (Plaintiff's Ex. 2, Dkt. No. 44-4 at 142) (emphasis added).) And the defendant in *PLHC* did not disagree that "substantially horizontal" meant "aligned with the target zone," so the *PLHC* court did not address the argument presented here. (*Id*. at 136, Dkt. No. 44-4 at 145.) Further, applicant statements made in prosecuting the application for the '840 Patent regarding "horizontal" and "vertical" bores were not before the *PLHC* court, so the intrinsic record here is different than that considered in *PLHC*.[5]

That said, the specification suggests that a "horizontal" bore is one that aligns with, and follows the contours of, the target zone. For example, with reference to Figure 1, the '840 Patent describes:

> The portion 34 is substantially horizontal in that it lies substantially in the plane of the coal seam 15. The portion 34 intersects the cavity 20 of the well bore 12. It should be understood that portion 34 may be formed at any suitable angle relative to the surface 14 to accommodate the dip or other geometric characteristics of the coal seam 15. It will also be understood that the curved or radius portion 36 may directly intersect the cavity 20 and that the portion 34 may undulate, be formed partially or entirely outside the coal seam 15 and/or may be suitably angled.

'840 Patent col.13 ll.49–50 & fig.1. Similarly, with reference to Figure 1, the patent describes,

> The well bore pattern 50 may be substantially horizontal corresponding to the geometric characteristics of the coal seam 15. The well bore pattern 50 may include sloped, undulating, or other inclinations of the coal seam 15 or other subterranean zone. During formation of well bore pattern 50, gamma ray logging tools and conventional MWD devices may be employed to control and direct the orientation of the drill bit 42 to retain the well bore pattern 50 within the confines of the coal seam 15 and to provide substantially uniform coverage of a desired area within the coal seam 15.

[5] The Court notes that there appears to be substantial similarity between the descriptions of the '840 Patent and the '119 Patent before the *PLHC* court. The term "substantially horizontal" construed in *PLHC* was from the claims of the '533 Patent, not the '119 Patent. And the similarities between the '533 Patent and the '840 Patent are not readily apparent (the '533 Patent has roughly 12 columns of description, the '840 Patent has roughly 118 columns).

Id. at col.14 ll.44–52.

Thus, a bore is still horizontal if it aligns with the zone, even if the bore makes an angle with the horizon other than 90 degrees to follow the zone's variance. But that doesn't mean that this holds true regardless of the zone. Taken to the logical extreme, a bore that follows a zone with an extreme dip, say 90 degrees, would still be "horizontal" even though the bore extends in a downward or upward direction (traditionally "vertical").

The prosecution history suggests that "horizontal" and "vertical" have the same meaning in the patent and in the field as they do in everyday parlance—i.e., they are defined with respect to the horizon (or, equivalently, with respect to gravity). In distinguishing a prior-art reference, U.S. Patent No. 4,773,488 ("*Bell*"), the applicant characterized *Bell* as not including horizontal or vertical bores, even though the reference disclosed bores deviated between 30 and 87.5 degrees from true vertical. ('840 Patent File Wrapper, May 16, 2014 Response at 10 (Defendants' Ex. 6, Dkt. No. 46-7 at 12).) *Bell*, in the background section, describes vertical and horizontal bores as follows:

> Heretofore, most wells drilled in the earth to produce oil, gas and other minerals therefrom have been drilled essentially ***vertically*** so that the wellbores penetrate the mineral producing formation essentially at right angles although not precisely at right angles because the producing formation may dip from ***horizontal*** from place to place. However, the point is that the wellbores were essentially deliberately drilled vertically and in many situations, a lot of effort was put into the drilling procedure to insure that the wellbore remained essentially vertical rather than deviating to any substantial degree to an angle from vertical.
>
> Deviated wellbores have been drilled, particularly in offshore applications, which do curve at an angle from vertical, but no particular effort has been put into the drilling procedure to insure that the wellbores penetrated the producing formation in a systematic fashion at an angle from vertical. In fact, a particular species of deviated wellbore, known as drainhole wellbores, deliberately turns essentially a 90 degree angle from vertical at or in the producing formation so that the wellbore can be extended essentially ***horizontally*** away from the vertical primary wellbore as to stay within the producing formation. The drainhole wellbore is then drilled horizontally out into the producing formation as far as possible.

(*Bell* col.1 ll.6–30 (Plaintiff's Reply Ex. 1, Dkt. No. 51-2 at 5) (emphasis added).) Thus, "vertical" and "horizontal" are used in *Bell* in their traditional sense, and are not defined relative to the zone. And the applicant, in its prosecution-history statements, accepted *Bell's* reference point for "vertical" and "horizontal." For example, the applicant stated:

> Generally, Bell describes a method for drilling radially outward from a central drill site, where the wellbores are drilled at angles of about 30 to about 87.5 degrees from vertical (Abstract). Bell states that drilling both vertical and horizontally is deliberately avoided (col. 1, ln. 37-42). At col. 1, In. 42-46, Bell states that, "(t)he wellbores of this invention are drilled at an angle ***from vertical*** (emphasis added) but not horizontal so that the wellbores pass through the formation at varying angles all of which are different from vertical and horizontal." . . . Bell teaches the drilling of multiple radially outward angles bores from a central site, where the bores are drilled to explicitly avoid both vertical and horizontal sections.

('840 Patent File Wrapper, May 16, 2014 Response at 10 (Defendants' Ex. 6, Dkt. No. 46-7 at 12) (emphasis in original).) Similarly, the applicant stated:

> In contrast, Bell describes a method for drilling radially outward from a central drill site, where the wellbores are drilled at angles of about 30 to about 87.5 degrees from vertical (Abstract). At col. 1, ln. 42-46, Bell states that, "(t)he wellbores of this invention are drilled at an angle from vertical ***but not horizontal*** (emphasis added) so that the wellbores pass through the formation at varying angles all of which are different from vertical and horizontal." Further, at col. 2, ln. 56-60, Bell states, "(a)lso, substantial exposure of the development. wellbores in the interior of the subsurface mineral producing formation is achieved ***without using the horizontal drainhole concept*** (emphasis added)." In summary, Bell teaches the drilling of multiple bores from a central site, where the bores are not drilled in a horizontal subsurface area. . . .
>
> In fact, Bell explicitly teaches away from use of horizontal bores, as noted in the citations above.

('840 Patent File Wrapper, April 2, 2014 Response at 7–9 (Defendants' Ex. 6, Dkt. No. 46-13 at 8–10) (emphasis in original).) This prosecution history does not rise to the level of disclaimer—and the Court rejects that that angles mentioned in *Bell's* abstract limit the claims of the '840 Patent. Rather, the prosecution history demonstrates that the '840 Patent's applicant understood

"horizontal" and "vertical" bores to be oriented as *Bell* described, i.e., with reference to the horizon.

But both *Bell* and the '840 Patent allow that a horizontal bore is one that stays in the formation, and the '840 Patent expressly states that a horizontal bore "may include sloped, undulating, or other inclinations of the . . . subterranean zone." '840 Patent col.14 ll.44–52. Given the intrinsic evidence, the Court determines that a bore is substantially horizontal if it substantially aligns with the zone, and the zone itself is substantially parallel to the horizon. The Court declines to adopt Defendants' negative limitations.

Vertical / Substantially Vertical. The Court is not persuaded that "vertical" in the context of the '840 Patent means "perpendicular to the target zone" regardless of the dip of the zone. Again, Plaintiff relies heavily on the *PLHC* construction of this term in related patents. But, as discussed above, the *PLHC* construction is not binding on the Court and the *PLHC* court did not have the benefit of the applicant statements made in prosecuting the application for the '840 Patent.

As set forth above, the prosecution history indicates that the applicant understood "vertical" and "horizontal" in the traditional sense—as unrelated to the zone. Examination of the '840 Patent further suggests that the traditional meaning of "vertical" is the better interpretation. One issue is that the dual-zone embodiment creates uncertainty under Plaintiff's construction. In

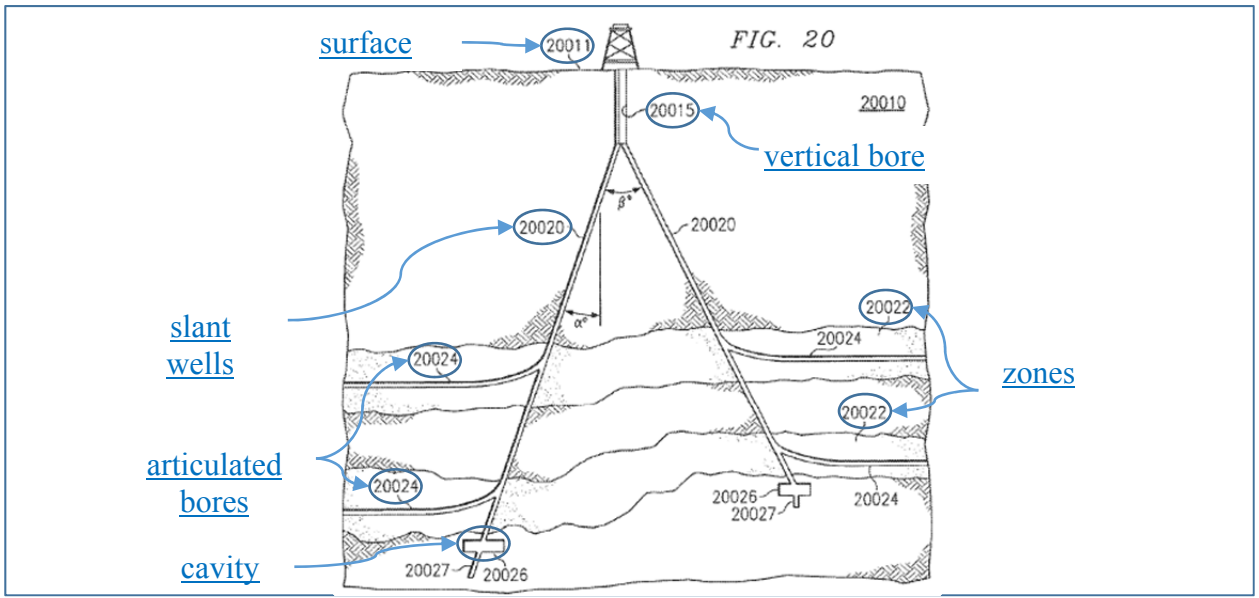
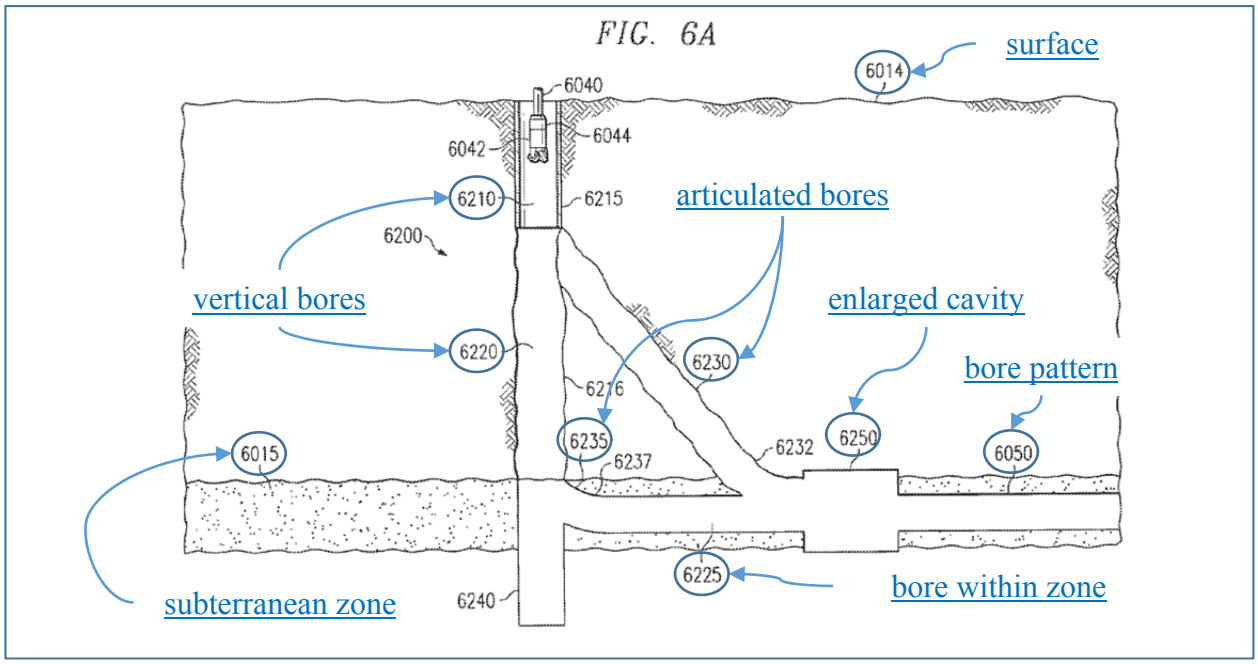


Figure 20, for example, is the vertical bore vertical with respect to the upper zone or the lower? What if one zone dips substantially more than the other?

Another issue is that in some examples, the angle of the vertical bore is expressly stated as making an angle relative to the surface, contrary to Plaintiff's proposed construction. For example, with reference to Figure 6A, the patent states:

> In FIGS. 6A-8, well bores 6210 and 6220 are illustrated substantially vertical; however, it should be understood that well bores 6210 and 6220 may be formed at ***any suitable angle relative to the surface*** 614 to accommodate, for example, surface 614 geometries and attitudes and/or the geometric configuration or attitude of a subterranean resource.

'840 Patent col.23 ll.31–37.



With respect to whether the vertical bore can be inclined or curved in any way, that is addressed in the patent: The '840 Patent states that the vertical bore is meant to work well with sucker-rod pumps and thus should not be articulated or curved and should not be deviated more than thirty-five degrees:

> Horizontal drilling patterns have been tried in order to extend the amount of coal seams exposed to a drill bore for gas extraction. Such horizontal drilling techniques, however, require the use of a radiused well bore which presents difficulties in removing the entrained water from the coal seam. The most efficient method for pumping water from a subterranean well, a sucker rod pump, does not work well in horizontal or radiused bores.

'840 Patent col.3 ll.51–58.

> ***The well bore 12 is substantially vertical or non-articulated in that it allows sucker rod, Moineau and other suitable rod, screw and/or other efficient bore hole pumps or pumping system to lift fluids up the bore 12 to the surface 14***. Thus, the well bore 12 may include suitable angles to accommodate surface 14 characteristics, geometric characteristics of the coal seam 15, characteristics of intermediate formations and may be slanted at a suitable angle or angles along its length or parts of its length. In particular embodiments, ***the well bore 12 may slant up to 35 degrees*** along its length or in sections but not itself be fully articulated to horizontal.

'840 Patent col.12 l.60–col.13 l.3 (emphasis added). Given the intrinsic evidence, the Court determines that a bore is substantially vertical if it is straight (within the parameters of sucker-rod pumps) and substantially vertical. The Court declines to otherwise adopt Defendants' negative limitations.

Accordingly, the Court construes "substantially vertical" and "substantially horizontal" as follows:

- "substantially vertical" means "substantially straight and substantially perpendicular to the horizon"; and
- "substantially horizontal" means "substantially aligned with the zone, which is substantially parallel to the horizon."

E. "coupled"

Disputed Term	Plaintiff's Proposed Construction	Defendant' Proposed Construction
"coupled" • Claims 5, 18	directly connected	separate and distinct from and directly connected

The Parties' Positions

Plaintiff submits that the construction it proposes for "coupled" is the same construction of "coupled" in related patents that was agreed to by the parties in *PLHC* and was adopted by the court in *CNX Gas Corp. et al. v. CDX Gas, LLC*, No. 05-cv-1574 (W.D. Penn. Oct. 13, 2006) (adopting the Special Master's Report and Recommendation). (Dkt. No. 44 at 8–9, 27.) Plaintiff submits that there is nothing in the claim language to suggest Defendants' proposed "separate and distinct" limitation and argues that: (1) Claim 5's "drainage bore" that is coupled to a "cavity" may itself include the cavity; and (2) Claim 18's "wellbore" that is coupled to a "drainage bore" is separately claimed as including a vertical portion from which the drainage bore extends, thus the addition of the "separate and distinct" limitation would needlessly complicate the case and render claim language superfluous. (*Id*. at 27–28.)

In addition to the claims themselves, Plaintiff cites the following **extrinsic evidence** to support its position: Special Master's Report and Recommendation on Claim Construction, *Effective Exploration, LLC v. Pennsylvania Land Holdings Company LLC et al.*, No. 14-cv-00845 (W.D. Penn. May 8, 2015) (Plaintiff's Ex. 2, Dkt. No. 44-4); Report and Recommendation, *CNX Gas Corp. et al. v. CDX Gas, LLC*, No. 05-cv-1574 (W.D. Penn. Aug. 30, 2006) (Plaintiff's Ex. 4, Dkt. No. 44-6).

Defendants respond that "coupled" is used consistently in the claims and the description to denote the connection of two separate things. (Dkt. No. 46 at 22–23.) Defendants argue that the '840 Patent always describes "coupled" wellbores as separately drilled bores joined underground and never as two portions of a continuously drilled articulated bore. (*Id*. at 23.) Defendants further respond that the cavity and bore are two separate things, i.e., that the cavity is not simply a portion of the bore, and that this was the holding in *PLHC*. (*Id*. at 23.)

In addition to the claims themselves, Defendants cite the following intrinsic and extrinsic evidence to support their position. **Intrinsic evidence**: '840 Patent col.85 ll.7–10. fig.79. **Extrinsic evidence**: Special Master's Report and Recommendation on Claim Construction, *Effective Exploration, LLC v. Pennsylvania Land Holdings Company LLC et al.*, No. 14-cv-00845 (W.D. Penn. May 8, 2015) (Plaintiff's Ex. 2, Dkt. No. 44-4).

Plaintiff replies that the plain meaning of "coupled," as used in the '840 Patent, encompasses the joining of portions of wellbores. (Dkt. No. 51 at 11.)

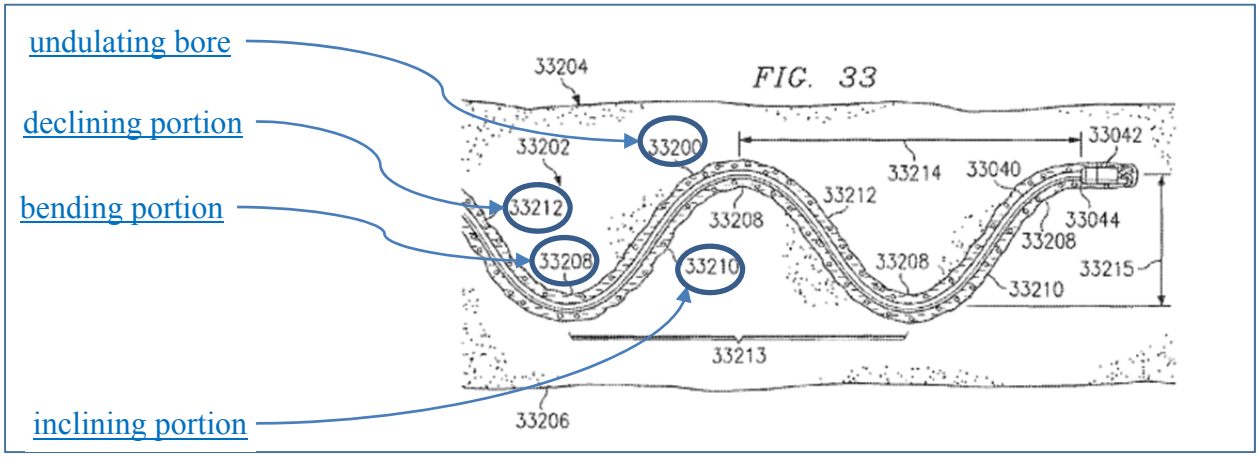
Analysis

The dispute here is whether the items that are coupled according to the claims are "separate and distinct" as advocated by Defendants and, more specifically, "whether a single continuous wellbore could be coupled to itself." The Court finds Defendants' argument unsupported by the intrinsic record and their proposed construction potentially confusing. Therefore, the Court rejects Defendants' argument and proposed construction.

The term "couple" is used in the '840 Patent in the exact way that the Defendants are trying to read out of the claims—describing the transitional connection between two portions of a bore. Specifically, in describing an undulating bore—a "single continuous wellbore"—the '840 Patent notes with reference to Figure 33 (reproduced and annotated below) that sections of the bore are coupled one to the other:

> In one embodiment of the present invention, undulating well bore 33200 may include at least one bending portion 33208, at least one inclining portion 33210, and at least one declining portion 33212. . . . The wavelength 33214 may be measured from any point on waveform 33213 to the next similar point on the waveform 33213. For example, wavelength 33214 may be measured from the top of the crest of a bending portion 33208 located near the upper boundary 33204 to the top of the crest of the next bending portion 33208 located near the upper boundary 33204. Alternatively, ***wavelength 33214 may be measured from a point where bending portion 33208 transitions to inclining portion 33210 to the next point where bending portion 33208 couples to the next inclining portion 33210***.

'840 Patent col.51 l.36–col.52 l.5 (emphasis added). Thus, one portion of the undulating bore, the bending portion, is described as "coupled" to another portion of the undulating bore, the inclining portion. According to the patent, portions of a thing, such as a borehole, can be coupled to each other. As Defendants intend the "separate and distinct" language to exclude such coupling, the language is properly rejected. *MBO Labs., Inc. v. Becton, Dickinson & Co.*, 474 F.3d 1323, 1333 (Fed. Cir. 2007) ("A claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct." (quotation marks omitted)).



Accordingly, the Court rejects Defendants "separate and distinct" construction and construes "coupled" as follows:

- "coupled" means "directly connected."

V. CONCLUSION

The Court adopts the above constructions set forth in this opinion for the disputed terms of the ’840 Patent. The parties are ordered that they may not refer, directly or indirectly, to each other’s claim construction positions in the presence of the jury. Likewise, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 19th day of August, 2015.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE